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**LAND RESOURCE INVENTORY AND SOCIO-ECONOMIC STATUS OF
FARM HOUSEHOLDS FOR WATERSHED PLANNING AND
DEVELOPMENT**

BIKKANAHALLI (4D4A1W2b) MICRO WATERSHED

Alavandi Hobli, Koppal Taluk and District, Karnataka

Karnataka Watershed Development Project – II

SUJALA – III

World Bank funded Project



ICAR – NATIONAL BUREAU OF SOIL SURVEY AND LAND USE PLANNING



ICAR - NBSS & LUP



**WATERSHED DEVELOPMENT DEPARTMENT
GOVT. OF KARNATAKA, BANGALORE**



About ICAR - NBSS&LUP

The ICAR-National Bureau of Soil Survey and Land Use Planning (ICAR-NBSS&LUP), Nagpur, a premier Institute of the Indian Council of Agricultural Research (ICAR), was set up during 1976 with the objective to prepare soil resource maps at national, state and district levels and to provide research inputs in soil resource mapping and its applications, land evaluation, land use planning, land resource management, and database management using GIS for optimising land use on different kinds of soils in the country.

The Bureau has been engaged in carrying out soil resource survey, agro-ecological and soil degradation mapping at the country, state and district levels for qualitative assessment and monitoring the soil health towards viable land use planning. The research activities have resulted in identifying the soil potentials and problems, and the various applications of the soil surveys with the ultimate objective of sustainable agricultural development. The Bureau has the mandate to correlate and classify soils of the country and maintain a National Register of all the established soil series. The Institute is also imparting in-service training to staff of the soil survey agencies in the area of soil survey, land evaluation and soil survey interpretations for land use planning. The Bureau in collaboration with Panjabrao Krishi Vidyapeeth, Akola is running post-graduate teaching and research programme in land resource management, leading to M.Sc. and Ph.D. degrees.

Citation: Rajendra Hegde, Ramesh kumar, S.C., K.V. Niranjana, S. Srinivas, M.Lalitha, B.A. Dhanorkar, R.S. Reddy and S.K. Singh (2019). "Land Resource Inventory and Socio-Economic Status of Farm Households for Watershed Planning and Development of Bikkanahalli-1 (4D4A1W2b) Microwatershed, Alavandi Hobli, Koppal Taluk and District, Karnataka", ICAR-NBSS&LUP Sujala MWS Publ. 282 ICAR – NBSS & LUP, RC, Bangalore. p.151 & 44.

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ICAR-NBSS&LUP Sujala MWS Publ.282



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KARNATAKA, BANGALORE**



PREFACE

In Karnataka, as in other Indian States, the livelihoods of rural people are intertwined with farming pursuits. The challenges in agriculture are seriously threatening the livelihood of a large number of farmers as they have been practicing farming in contextual factors beyond their control. Climatic factors are the most important ones and have become much more significant in recent times due to rapid climate changes induced by intensive anthropogenic activities affecting our ecosystem in multiple ways. Climate change has become the reality, it is happening and efforts to evolve and demonstrate climate resilient technologies have become essential. Due to the already over stressed scenario of agrarian sector, the climate change is resulting in manifold increase in the complexities, pushing the rural mass to face more and more unpredictable situations. The rising temperatures and unpredictable rainfall patterns are going to test seriously the informed decisions farmers have to make in order to survive in farming and sustain their livelihood.

It is generally recognized that impacts of climate change shall not be uniform across the globe. It is said that impact of climate change is more severe in South Asia. Based on the analysis of meteorological data, it is predicted that in India, there will be upward trend in mean temperature, downward trend in relative humidity, annual rainfall and number of wet days in a year. Also, in general, phenomena like erratic monsoon, spread of tropical diseases, rise in sea levels, changes in availability of fresh water, frequent floods, droughts, heat waves, storms and hurricanes are predicted. Each one of these adverse situations are already being experienced in various parts of India and also at the global level. Decline in agricultural productivity of small and marginal farmers becoming more vulnerable is already witnessed.

In Karnataka, more than 60 per cent of the population live in rural areas and depend on agriculture and allied activities for their livelihood. Though the state has achieved significant progress in increasing the yield of many crops, there is tremendous pressure on the land resources due to the growing and competing demands of various land uses. This is reflected in the alarming rate of land degradation observed. Already more than 50 per cent of the area is affected by various forms of degradation. If this trend continues, the sustainability of the fragile ecosystem will be badly affected. The adverse effects of change in the climatic factors are putting additional stress on the land resources and the farmers dependent on this.

The natural resources (land, water and vegetation) of the state need adequate and constant care and management, backed by site-specific technological interventions and investments particularly by the government. Detailed database pertaining to the nature of

the land resources, their constraints, inherent potentials and suitability for various land based rural enterprises, crops and other uses is a prerequisite for preparing location-specific action plans, which are in tune with the inherent capability of the resources. Any effort to evolve climate resilient technologies has to be based on the baseline scientific database. Then only one can expect effective implementation of climate resilient technologies, monitor the progress, make essential review of the strategy, and finally evaluate the effectiveness of the implemented programs. The information available at present on the land resources of the state are of general nature and useful only for general purpose planning. Since the need of the hour is to have site-specific information suitable for farm level planning and detailed characterization and delineation of the existing land resources of an area into similar management units is the only option.

ICAR-NBSS&LUP, Regional Centre, Bangalore has taken up a project sponsored by the Karnataka Watershed Development Project-II, (Sujala-III), Government of Karnataka funded by the World Bank under Component -1 Land Resource Inventory. This study was taken up to demonstrate the utility of such a database in reviewing, monitoring and evaluating all the land based watershed development programs on a scientific footing. To meet the requirements of various land use planners at grassroots level, the present study on “Land Resource Inventory and Socio-Economic Status of Farm Households for Watershed Planning and Development of for Bikkanahalli microwatershed in Koppal Taluk, Koppal District, Karnataka” for integrated development was taken up in collaboration with the State Agricultural Universities, IISC, KRSRAC, KSNDMC as Consortia partners. The project provides detailed land resource information at cadastral level (1:7920 scale) for all the plots and socio-economic status of farm households covering thirty per cent farmers randomly selected representing landed and landless class of farmers in the micro-watershed. The project report with the accompanying maps for the microwatershed will provide required detailed database for evolving effective land use plan, alternative land use options and conservation plans for the planners, administrators, agricultural extension personnel, KVK officials, developmental departments and other land users to manage the land resources in a sustainable manner.

It is hoped that this database will be useful to the planners, administrators and developmental agencies working in the area in not only for formulating location specific developmental schemes but also for their effective monitoring at the village/watershed level.

Nagpur

Date: 27-07-2019

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PART-A

LAND RESOURCE INVENTORY

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EXECUTIVE SUMMARY

The land resource inventory of Bikkanahalli microwatershed was conducted using village cadastral maps and IRS satellite imagery on 1:7920 scale. The false colour composites of IRS imagery were interpreted for physiography and these physiographic delineations were used as base for mapping soils. The soils were studied in several transects and a soil map was prepared with phases of soil series as mapping units. Random checks were made all over the area outside the transects to confirm and validate the soil map unit boundaries. The soil map shows the geographic distribution and extent, characteristics, classification, behavior and use potentials of the soils in the Microwatershed.

The present study covers an area of 548 ha in Koppal taluk and district, Karnataka. The climate is semiarid and categorized as drought - prone with an average annual rainfall of 662 mm, of which about 424 mm is received during south –west monsoon, 161 mm during north-east and the remaining 77 mm during the rest of the year. An area of about 96 per cent is covered by soil and 4 per cent by habitation and water body. The salient findings from the land resource inventory are summarized briefly below

- ❖ The soils belong to 17 soil series and 26 soil phases (management units) and 8 land use classes.*
- ❖ The length of crop growing period is <90 days and starts from 2nd week of August to 2nd week of November.*
- ❖ From the master soil map, several interpretative and thematic maps like land capability, soil depth, surface soil texture, soil gravelliness, available water capacity, soil slope and soil erosion were generated.*
- ❖ Soil fertility status maps for macro and micronutrients were generated based on the surface soil samples collected at every 320 m grid interval.*
- ❖ Land suitability for growing 31 major agricultural and horticultural crops were assessed and maps showing the degree of suitability along with constraints were generated.*
- ❖ Entire area is suitable for agriculture.*
- ❖ About 16 per cent of the soils are shallow (25-50 cm), 10 per cent of the soils are moderately shallow (50-75 cm), 16 per cent moderately deep (75- 100 cm) and 54 per cent is deep to very deep (100->150cm) soils.*
- ❖ About 13 per cent loamy (sandy loam and sandy clay loam) and 83 per cent has clayey (sandy clay and clay) soils at the surface.*
- ❖ About 37 per cent of the area has non-gravelly (<15%) soils, 56 per cent has gravelly soils (15-35 % gravel) and 3 per cent very gravelly (35-60 %) soils.*
- ❖ With respect to available water capacity 20 per cent of the area has very low (<50mm/m), 35 per cent of the area has low (51-100 mm/m), 18 per cent medium (101-150 mm/m), 2 per cent high (151-200 mm/m) and 21 per cent area has very high (>200mm/m) in available water capacity.*

- ❖ *An area of about 13 per cent has nearly level (0-1%) lands and 83 per cent has very gently sloping (1-3%) lands.*
- ❖ *An area of about 41 per cent is slightly eroded (e1) and 55 per cent is moderately eroded (e2) lands.*
- ❖ *An area of about 2 per cent slightly alkaline (pH 7.3 to 7.8), 44 per cent moderately alkaline (pH 7.8 to 8.4), 22 per cent strongly alkaline (pH 8.4-9.0) and 28 per cent very strongly alkaline (pH >9.0) in reaction.*
- ❖ *The Electrical Conductivity (EC) of the soils are dominantly $<2 \text{ dsm}^{-1}$ indicating that soils are non saline.*
- ❖ *Organic carbon is low ($<0.5\%$) in 48 per cent, medium (0.5-0.75%) in 48 per cent and high ($>0.75\%$) in <1 per cent area of the soils.*
- ❖ *Available phosphorus is low ($<23 \text{ kg/ha}$) in 25 per cent and medium (23-57 kg/ha) in 71 per cent of the soils.*
- ❖ *Available potassium is medium (145-337 kg/ha) in 3 per cent and high ($>337 \text{ kg/ha}$) in 93 per cent of the soils.*
- ❖ *Available sulphur is medium (10-20 ppm) in 71per cent and high ($>20 \text{ ppm}$) in 25 per cent area of the soils.*
- ❖ *Available boron is low ($<0.5 \text{ ppm}$) in 87 per cent and medium (0.5-1.0) in 9 per cent area of the microwatershed.*
- ❖ *Available iron is sufficient ($>4.5 \text{ ppm}$) in the entire area.*
- ❖ *Available zinc is deficient ($<0.6 \text{ ppm}$) in the entire area of the microwatershed.*
- ❖ *Available manganese and copper are sufficient in the entire area.*
- ❖ *The land suitability for 31 major agricultural and horticultural crops grown in the microwatershed was assessed and the areas that are highly suitable (class S1) and moderately suitable (class S2) are given below. It is however to be noted that a given soil may be suitable for various crops but what specific crop to be grown may be decided by the farmer looking to his capacity to invest on various inputs, marketing infrastructure, market price, and finally the demand and supply position.*

Land suitability for various crops in the microwatershed

| Crop | Suitability Area in ha (%) | | Crop | Suitability Area in ha (%) | |
|--------------------|-----------------------------------|---------------------------------|----------------------|-----------------------------------|---------------------------------|
| | Highly suitable (S1) | Moderately suitable (S2) | | Highly suitable (S1) | Moderately suitable (S2) |
| <i>Sorghum</i> | 174(32) | 182(33) | <i>Sapota</i> | 54(10) | 135(24) |
| <i>Maize</i> | 42(8) | 313(58) | <i>Pomegranate</i> | 96(18) | 220(40) |
| <i>Bajra</i> | 119(22) | 250(45) | <i>Musambi</i> | 168(31) | 149(28) |
| <i>Groundnut</i> | 12(2) | 271(49) | <i>Lime</i> | 168(31) | 149(28) |
| <i>Sunflower</i> | 168(31) | 132(24) | <i>Amla</i> | 148(27) | 289(53) |
| <i>Redgram</i> | 54(10) | 237(43) | <i>Cashew</i> | 96(18) | 94(17) |
| <i>Bengal gram</i> | 119(22) | 236(43) | <i>Jackfruit</i> | 54(10) | 135(24) |
| <i>Cotton</i> | 131(24) | 224(41) | <i>Jamun</i> | 12(2) | 290(52) |
| <i>Chilli</i> | 77(14) | 150(27) | <i>Custard apple</i> | 267(49) | 170(31) |
| <i>Tomato</i> | 77(14) | 150(27) | <i>Tamarind</i> | 12(2) | 221(41) |
| <i>Brinjal</i> | 159(29) | 209(39) | <i>Mulberry</i> | 96(18) | 281(51) |
| <i>Onion</i> | 108(20) | 132(24) | <i>Marigold</i> | 54(10) | 301(55) |
| <i>Bhendi</i> | 108(20) | 260(48) | <i>Chrysanthemum</i> | 54(10) | 301(55) |
| <i>Drumstick</i> | 96(18) | 265(48) | <i>Jasmine</i> | 54(10) | 173(31) |
| <i>Mango</i> | 12(2) | 107(20) | <i>Crossandra</i> | 54(10) | 195(36) |
| <i>Guava</i> | 54(10) | 133(24) | | | |

Apart from the individual crop suitability, a proposed crop plan has been prepared for the 8 identified LUCs by considering only the highly and moderately suitable lands for different crops and cropping systems with food, fodder, fibre and other horticulture crops.

- ❖ *Maintaining soil-health is vital for crop production and conserve soil and land resource base for maintaining ecological balance and to mitigate climate change. For this, several ameliorative measures have been suggested to these problematic soils like saline/alkali, highly eroded, sandy soils etc.,*
- ❖ *Soil and water conservation and drainage line treatment plan has been prepared that would help in identifying the sites to be treated and also the type of structures required.*
- ❖ *As part of the greening programme, several tree species have been suggested to be planted in marginal and submarginal lands, field bunds and also in the hillocks, mounds and ridges. That would help in supplementing the farm income, provide fodder and fuel, and generate lot of biomass which in turn would help in maintaining the ecological balance and contribute to mitigating the climate change.*

INTRODUCTION

Land is a scarce resource and basic unit for any material production. It can support the needs of the growing population, provided they use the land in a rational and judicious manner. But what is happening in many areas of the state is a cause for concern to everyone involved in the management of land resources at the grassroots level. The area available for agriculture is about 51 per cent of the total area and more than 60 per cent of the people are still dependant on agriculture for their livelihood. The limited land area is under severe stress and strain due to increasing population pressure and competing demands of various land uses. Due to this, every year there is significant diversion of farm lands and water resources for non-agricultural purposes. Apart from this, due to lack of interest in farmers for farming, large tracts of cultivable lands are turning into fallows in many areas and this trend is continuing at an alarming rate.

Further, land degradation has emerged as a serious problem which has already affected about 38 lakh ha of cultivated area in the state. Soil erosion alone has degraded about 35 lakh ha. Almost all the uncultivated areas are facing various degrees of degradation, particularly soil erosion. Salinity and alkalinity has emerged as a major problem in more than 3.5 lakh ha in the irrigated areas of the state. Nutrient depletion and declining factor productivity is common in both rainfed and irrigated areas. The degradation is continuing at an alarming rate and there appears to be no systematic effort among the stakeholders to contain this process. In recent times, an aberration of weather due to climate change phenomenon has added another dimension leading to unpredictable situations to be tackled by the farmers.

In this critical juncture, the challenge before us is not only to increase the productivity per unit area which is steadily declining and showing a fatigue syndrome, but also to prevent or at least reduce the severity of degradation. If the situation is not reversed at the earliest, then the sustainability of the already fragile crop production system and the overall ecosystem will be badly affected in the state. The continued neglect and unscientific use of the resources for a long time has led to the situation observed at present in the state. It is a known fact and established beyond doubt by many studies in the past that the cause for all kinds of degradation is the neglect and irrational use of the land resources. Hence, there is urgent need to generate a detailed site-specific farm level database on various land resources for all the villages/watersheds in a time bound manner that would help to protect the valuable soil and land resources and also to stabilize the farm production.

Therefore, the land resource inventory required for farm level planning is the one which investigates not only the surface but also consider the other parameters which are critical for productivity *viz.*, soils, climate, water, minerals and rocks, topography, geology, hydrology, vegetation, crops, land use pattern, animal population, socio-

economic conditions, infrastructure, marketing facilities and various schemes and developmental works of the government etc. From the data collected at farm level, the specific problems and potentials of the area can be identified and highlighted, conservation measures required for the area can be planned on a scientific footing, suitability of the area for various uses can be worked out and finally viable and sustainable land use options suitable for each and every land holding can be prescribed.

The Land Resource Inventory is basically done for identifying potential and problem areas, developing sustainable land use plans, estimation of surface run off and water harvesting potential, preparation of soil and water conservation plans, land degradation/desertification etc. The Bureau is presently engaged in developing an LRI methodology using high resolution satellite remote sensing data and Digital Elevation Model (DEM) data to prepare Landscape Ecological Units (LEU) map representing agro-ecosystem as a whole. The LEU is preferred over landform as the base map for LRI. LEU is the assemblage of landform, slope and land use. An attempt was made to upscale the soil resource information from 1:250000 and 1:50000 scale to the LEU map in Goa and other states.

The land resource inventory aims to provide site-specific database for Bikkanahalli microwatershed in Koppal Taluk, Koppal District, Karnataka State for the Karnataka Watershed Development Department. The database was generated by using cadastral map of the village as a base along with high resolution IRS LISS IV and Cartosat-1 merged satellite imagery. Later, an attempt will be made to uplink this LRI data generated at 1:7920 scale under Sujala-III Project to the proposed Landscape Ecological Units (LEUs) map.

The study was organized and executed by the ICAR- National Bureau of Soil Survey and Land Use Planning, Regional Centre, Bangalore under Generation of Land Resource Inventory Data Base Component-1 of the Sujala-III Project funded by the World Bank.

GEOGRAPHICAL SETTING

2.1 Location and Extent

The Bikkanahalli micro-watershed is located in the central part of Karnataka in Koppal taluk and district (Fig.2.1). It lies between 15⁰15' and 15⁰17' North latitudes and 76⁰2' and 76⁰4' East longitudes and covers an area of about 548 ha. It is about 23 km from Koppal town. It comprises and bounded by Mynahalli on the north and west, Bikanahalli on the west, south and central and Bisarahalli on the eastern side of the microwatershed.

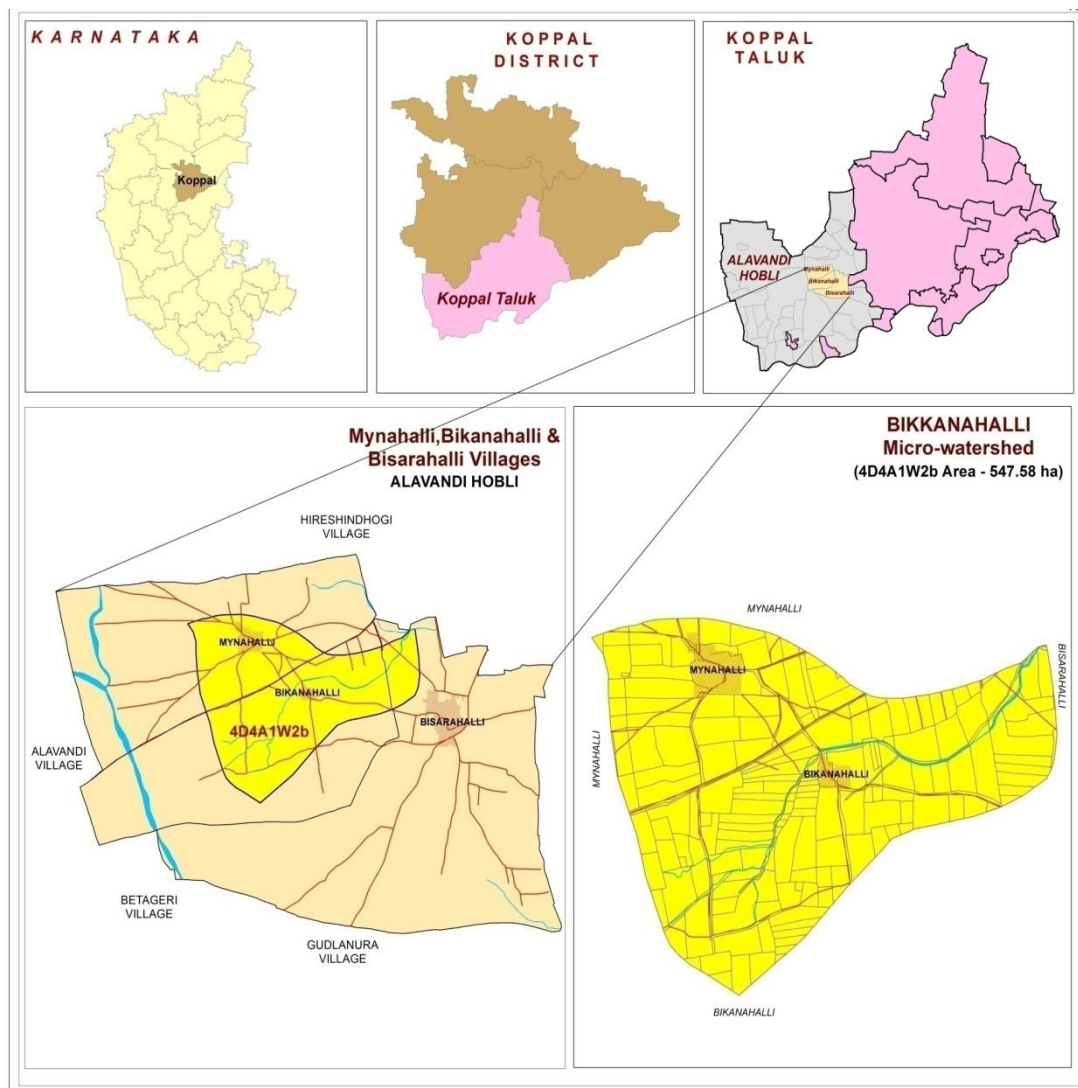


Fig.2.1 Location map of Bikkanahalli Microwatershed

2.2 Geology

Major rock formations observed in the microwatershed are granite gneiss and alluvium (Fig.2.2 a and b). Granite gneisses are essentially pink to gray and are coarse to medium grained. They consist primarily of quartz, feldspar, biotite and hornblende. The gray granite gneisses are highly weathered, fractured and fissured upto a depth of about

10 m. Dolerite dykes and quartz veins are common with variable width and found to occur in Bikkanahalli village. The thickness of the alluvium generally is limited to less than a meter, except in river valleys where it is very deep extending to tens of meters. Such soils are transported and represent paleo black soils originally formed at higher elevation, but now occupying river valleys.



Fig.2.2a Granite and granite gneiss rocks



Fig.2.2b Alluvium

2.3 Physiography

Physiographically, the area has been identified as Granite gneiss and Alluvial landscapes based on geology. The microwatershed area has been further divided into mounds/ridges, summits, side slopes and very gently sloping uplands and nearly level

plains based on slope and its relief features. The elevation ranges from 535 to 550 m in the gently sloping uplands. The mounds and ridges are mostly covered by rock outcrops.

2.4 Drainage

The area is drained by several small seasonal streams that join Hire *halla* and Chenna *halla* along its course. Though, the streams are not perennial, during rainy season they carry large quantities of rain water. The microwatershed has only few small tanks which are not able to store the water flowing during the rainy season. Due to this, the ground water recharge is very much affected in the villages. This is reflected in the failure of many bore wells in the villages. If the available rain water is properly harnessed by constructing tanks and recharge structures at appropriate places in the villages, then the drinking and irrigation needs of the area can be easily met. The drainage network is dendritic to sub parallel.

2.5 Climate

The district falls under semiarid tract of the state and is categorized as drought - prone with total annual rainfall of 662 mm (Table 2.1). Of this, a maximum of 424 mm precipitation is received during south–west monsoon period from June to September, north-east monsoon contributes about 161 mm and prevails from October to early December and the remaining 77 mm is received during the rest of the year. The winter season is from December to February. During April and May, the temperatures reach up to 45°C and in December and January, the temperatures will go down to 16°C. Rainfall distribution is shown in Figure 2.3. The average Potential Evapo Transpiration (PET) is 145 mm and varies from a low of 101 mm in December to 193 mm in the month of May. The PET is always higher than precipitation in all the months except in the month of September. Generally, the Length of crop Growing Period (LGP) is <90 days and starts from 2nd week of August to 2nd week of November.

Table 2.1 Mean Monthly Rainfall, PET, 1/2 PET at Koppal Taluk and District

| Sl. no. | Months | Rainfall | PET | 1/2 PET |
|--------------|-----------|---------------|---------------|---------|
| 1 | January | 1.60 | 116.70 | 58.35 |
| 2 | February | 1.50 | 129.20 | 64.60 |
| 3 | March | 14.10 | 169.80 | 84.90 |
| 4 | April | 18.10 | 180.60 | 90.30 |
| 5 | May | 41.60 | 193.50 | 96.75 |
| 6 | June | 85.80 | 167.90 | 83.95 |
| 7 | July | 72.10 | 156.20 | 78.10 |
| 8 | August | 110.50 | 152.50 | 76.25 |
| 9 | September | 155.60 | 138.50 | 69.25 |
| 10 | October | 116.30 | 122.30 | 61.15 |
| 11 | November | 36.00 | 106.40 | 53.20 |
| 12 | December | 9.10 | 101.00 | 50.50 |
| TOTAL | | 662.30 | 144.55 | |

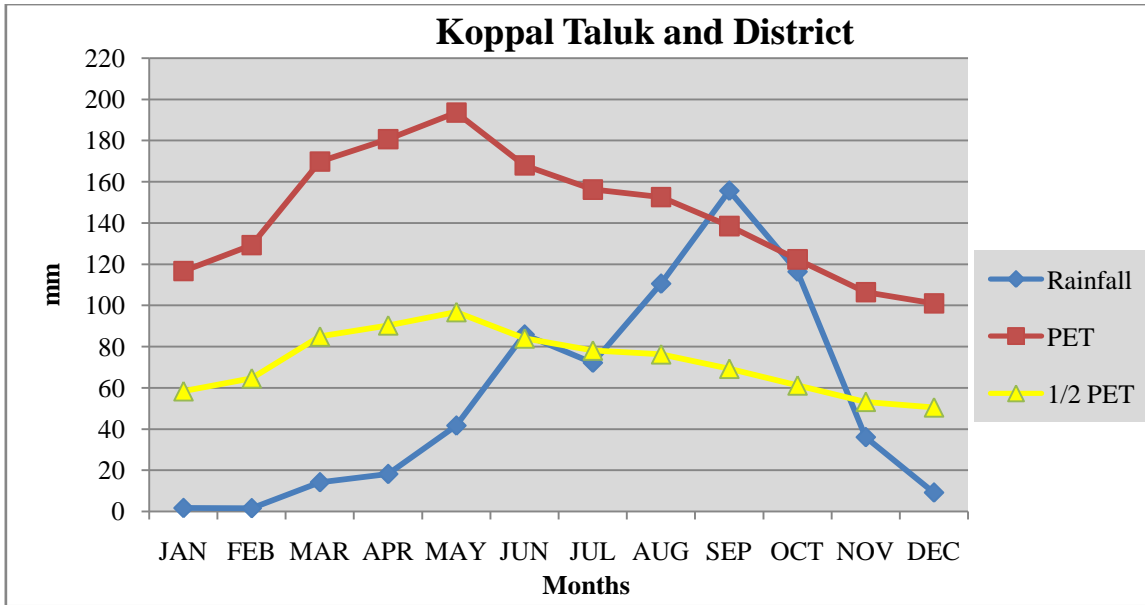


Fig. 2.3 Rainfall distribution in Koppal Taluk and District

2.6 Natural Vegetation

The natural vegetation is sparse comprising few tree species, shrubs and herbs. The mounds, ridges and boulders occupy sizeable areas which are under thin to moderately thick forest vegetation. Still, there are some remnants of the past forest cover which can be seen in patches in some ridges and hillocks in the microwatershed (Fig 2.4).

Apart from the continuing deforestation, the presence of large population of goats, sheep and other cattle in the microwatershed is causing vegetative degradation of whatever little vegetation left in the area. The uncontrolled grazing has left no time for the regeneration of the vegetative cover. This leads to the accelerated rate of erosion on the hill slopes, resulting in the formation of deep gullies in the foot slopes and eventually resulting in the heavy siltation of few tanks and reservoirs in the microwatershed.



Fig 2.4 Natural vegetation of Bikkanahalli microwatershed

2.7 Land Utilization

About 91 per cent area (Table 2.2) in Koppal district is cultivated at present and about 17 per cent of the area is sown more than once. An area of about 3 per cent is currently barren. Forests occupy a small area of about 5 per cent and the tree cover is in a very poor state. Most of the mounds, ridges and boulder areas have very poor vegetative cover. Major crops grown in the area are sorghum, maize, bajra, cotton, safflower, sunflower, red gram, horse gram, onion, mulberry, pomegranate, sugarcane, Bengal gram and groundnut (Fig 2.5). While carrying out land resource inventory, the land use/land cover particulars are collected from all the survey numbers and a current land use map of the microwatershed is prepared. The current land use map prepared shows the arable and non-arable lands, other land uses and different types of crops grown in the area. The current land use map of Bikkanahalli microwatershed is presented in Fig.2.6. Simultaneously, enumeration of existing wells (bore wells) is made and their location in different survey numbers is marked on the cadastral map. Map showing the location of wells in Bikkanahalli microwatershed is given in Fig 2.7.

Table 2.2 Land Utilization in Koppal District

| Sl. No. | Agricultural land use | Area (ha) | Per cent |
|---------|--------------------------|------------|----------|
| 1 | Total geographical area | 552495 | |
| 2 | Total cultivated area | 500542 | 90.6 |
| 3 | Area sown more than once | 92696 | 16.8 |
| 4 | Trees and groves | 210 | 0.04 |
| 5 | Cropping intensity | - | 118 |
| 6 | Forest | 29451 | 5.33 |
| 7 | Cultivable wasteland | 2568 | 0.46 |
| 8 | Permanent Pasture land | 14675 | 2.66 |
| 9 | Barren land | 16627 | 3.01 |
| 10 | Non agricultural land | 40591 | 7.35 |
| 11 | Current fallow | 19660 | 3.56 |



Fig.2.5 (a) Different crops and cropping systems in Bikkanahalli Microwatershed

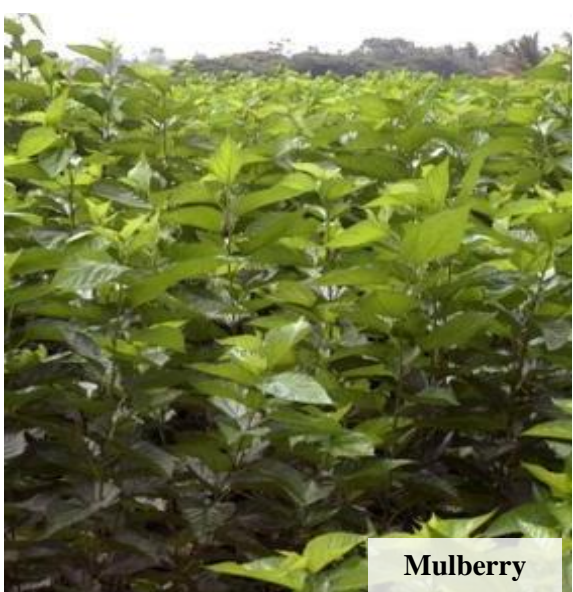


Fig.2.5 (b) Different crops and cropping systems in Bikkanahalli Microwatershed

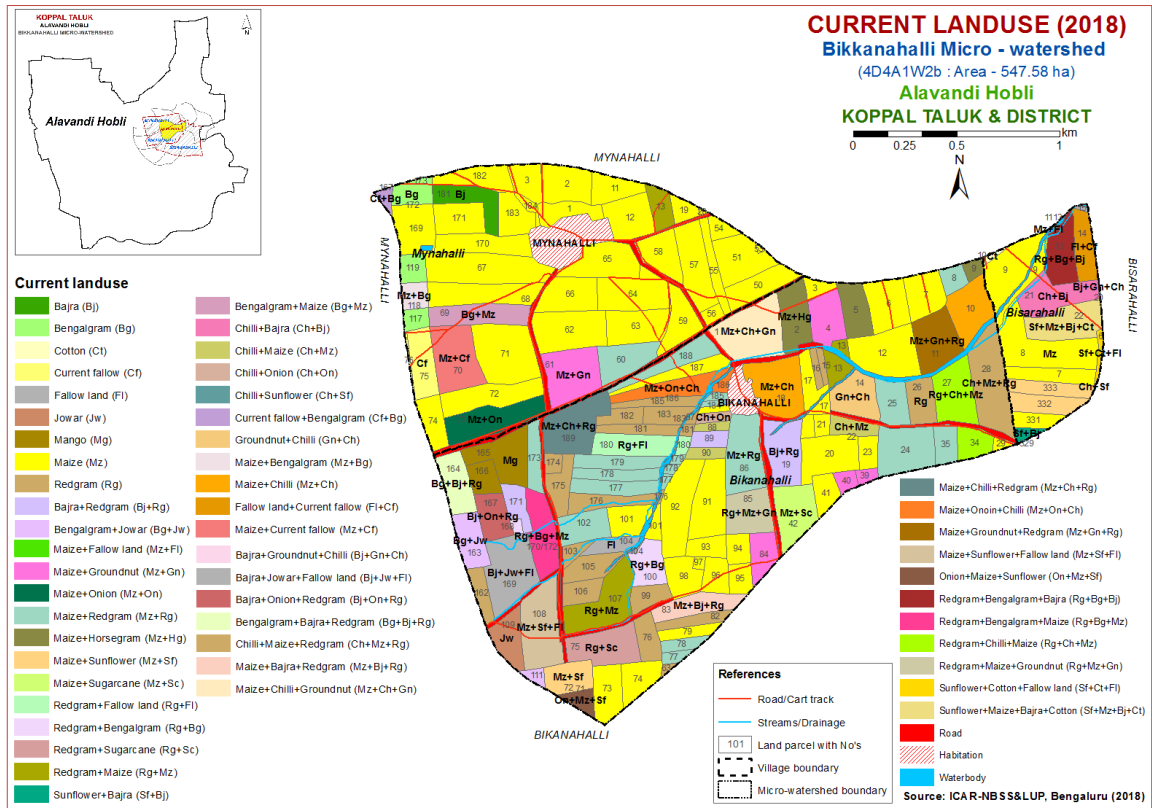


Fig.2.6 Current Land Use map of Bikkanahalli Microwatershed

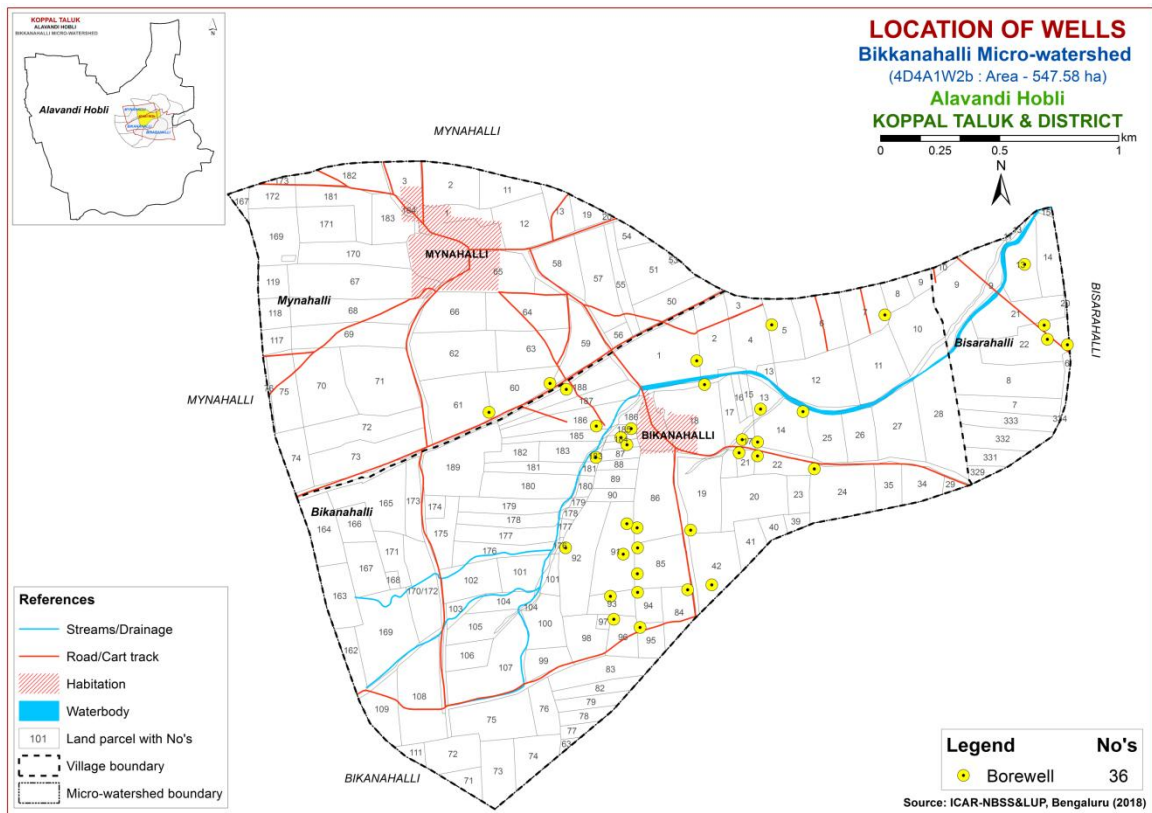


Fig.2.7 Location of wells map of Bikkanahalli Microwatershed

SURVEY METHODOLOGY

The purpose of land resource inventory is to delineate similar areas (soil series and phases), which respond or expected to respond similarly for a given level of management. This was achieved in Bikkanahalli microwatershed by the detailed study of all the soil characteristics (depth, texture, colour, structure, consistence, coarse fragments, porosity, soil reaction, soil horizons etc.) and site (slope, erosion, drainage, occurrence of rock fragments etc.) followed by grouping of similar areas based on soil-site characteristics into homogeneous (management units) units and showing their extent and geographic distribution on the microwatershed cadastral map. The detailed soil survey at 1:7920 scale was carried out in 548 ha area. The methodology followed for carrying out land resource inventory was as per the guidelines given in Soil Survey Manual (IARI, 1971; Soil Survey Staff, 2006; Natarajan *et al.*, 2015) which is briefly described below.

3.1 Base Maps

The detailed survey of the land resources occurring in the microwatershed was carried out by using digitized cadastral map and satellite imagery as base supplied by the KSRSAC. The cadastral map shows field boundaries with their survey numbers, location of tanks, streams and other permanent features of the area (Fig. 3.1). Apart from the cadastral map, remote sensing data products from Cartosat-1 and LISS IV merged at the scale of 1:7920 were used in conjunction with the cadastral map to identify the geology, landscapes, landforms and other surface features. The imagery helped in the identification and delineation of boundaries between hills, uplands and lowlands, water bodies, forest and vegetated areas, roads, habitations and other cultural features of the area (Fig.3.2).The cadastral map was overlaid on the satellite imagery (Fig.3.3) that helps to identify the parcel boundaries and other permanent features. Apart from cadastral maps and images, toposheets of the area (1:50,000 scale) were used for initial traversing, identification of geology, landscapes and landforms, drainage features, present land use and also for selection of transects in the microwatershed.

3.2 Image Interpretation for Physiography

False Colour Composites (FCC) of Cartosat-I and LISS-IV merged satellite data covering the microwatershed area was visually interpreted using image interpretation elements and all the available collateral data with local knowledge. The delineated physiographic boundaries were transferred on to a cadastral map overlaid on satellite imagery. Physiographically, the area has been identified as granite gneiss and alluvial landscapes and is divided into landforms such as ridges, mounds and uplands based on slope. They were further subdivided into physiographic/ image interpretation units based on image characteristics. The image interpretation legend for physiography is given below.

Image Interpretation Legend for Physiography

G- Granite gneiss landscape

- G1 Hills/ Ridges/ Mounds
 - G11 Summits
 - G12 Side slopes
 - G121 Side slopes with dark grey tones
- G2 Uplands
 - G21 Summits
 - G22 Gently sloping uplands
 - G221 Gently sloping uplands, yellowish green (eroded)
 - G222 Gently sloping uplands, yellowish white (severely eroded)
 - G23 Very gently sloping uplands
 - G231 Very gently sloping uplands, yellowish green
 - G232 Very gently sloping uplands, medium green and pink
 - G233 Very gently sloping uplands, pink and green (scrub land)
 - G234 Very gently sloping uplands, medium greenish grey
 - G235 Very gently sloping uplands, yellowish white (eroded)
 - G236 Very gently sloping uplands, dark green
 - G237 Very gently sloping uplands, medium pink (coconut garden)
 - G238 Very gently sloping uplands, pink and bluish white (eroded)

DSe -Alluvial landscape

DSe 1 Summit

- DSe 11 Nearly level Summit with dark grey tone
- DSe 12 Nearly level Summit with medium grey tone
- DSe 13 Nearly level Summit with whitish grey tone
- DSe 14 Nearly level Summit with whitish tone (Calcareousness)
- DSe 15 Nearly level Summit with pinkish grey tone
- DSe 16 Nearly level Summit with medium pink tone
- DSe 17 Nearly level Summit with bluish white tone
- DSe 18 Nearly level Summit with greenish grey tone

DSe 2 Very genetly sloping

- DSe 21 Very gently sloping, whitish tone
- DSe 22 Very gently sloping, greyish pink tone
- DSe 23 Very gently sloping, whitish grey tone
- DSe 24 Very gently sloping, medium grey tone
- DSe 25 Very gently sloping, medium pink tone
- DSe 26 Very gently sloping, dark grey tone
- DSe 27 Very gently sloping, bluish grey tone
- DSe 28 Very gently sloping, greenish grey tone
- DSe 29 Very gently sloping, Pinkish grey

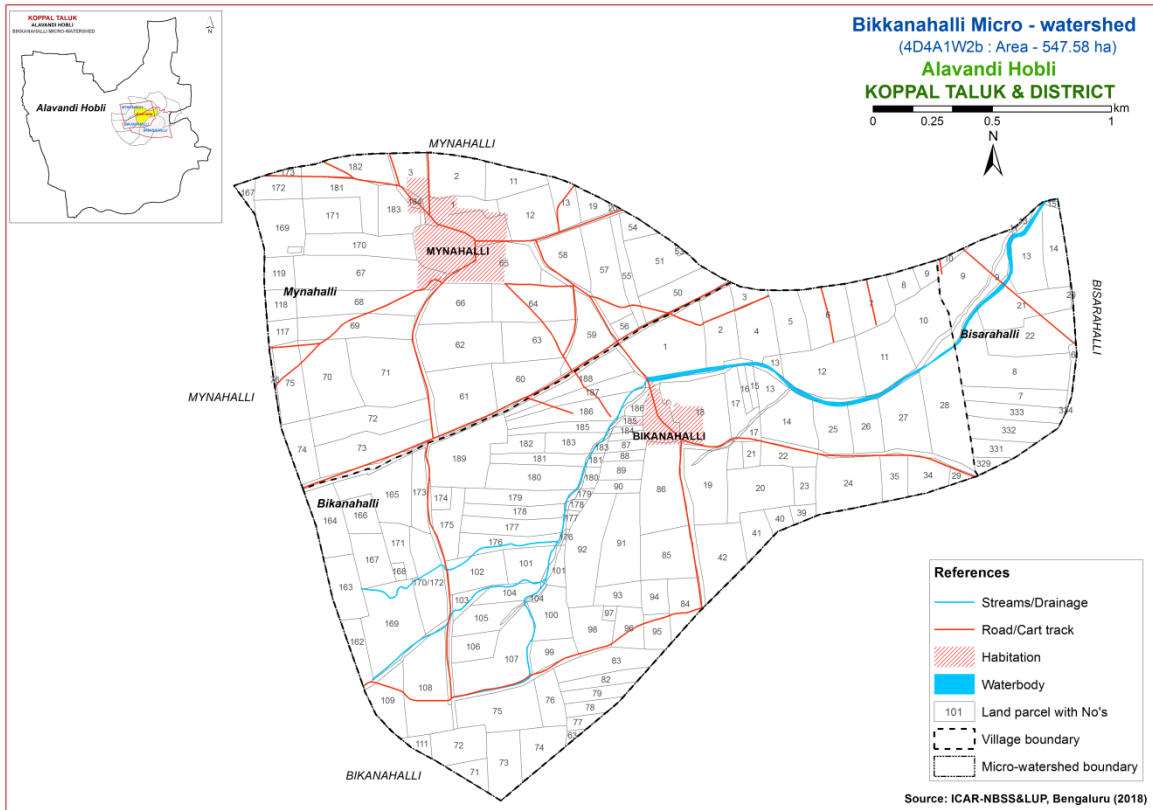


Fig 3.1 Scanned and Digitized Cadastral map of Bikkanahalli Microwatershed

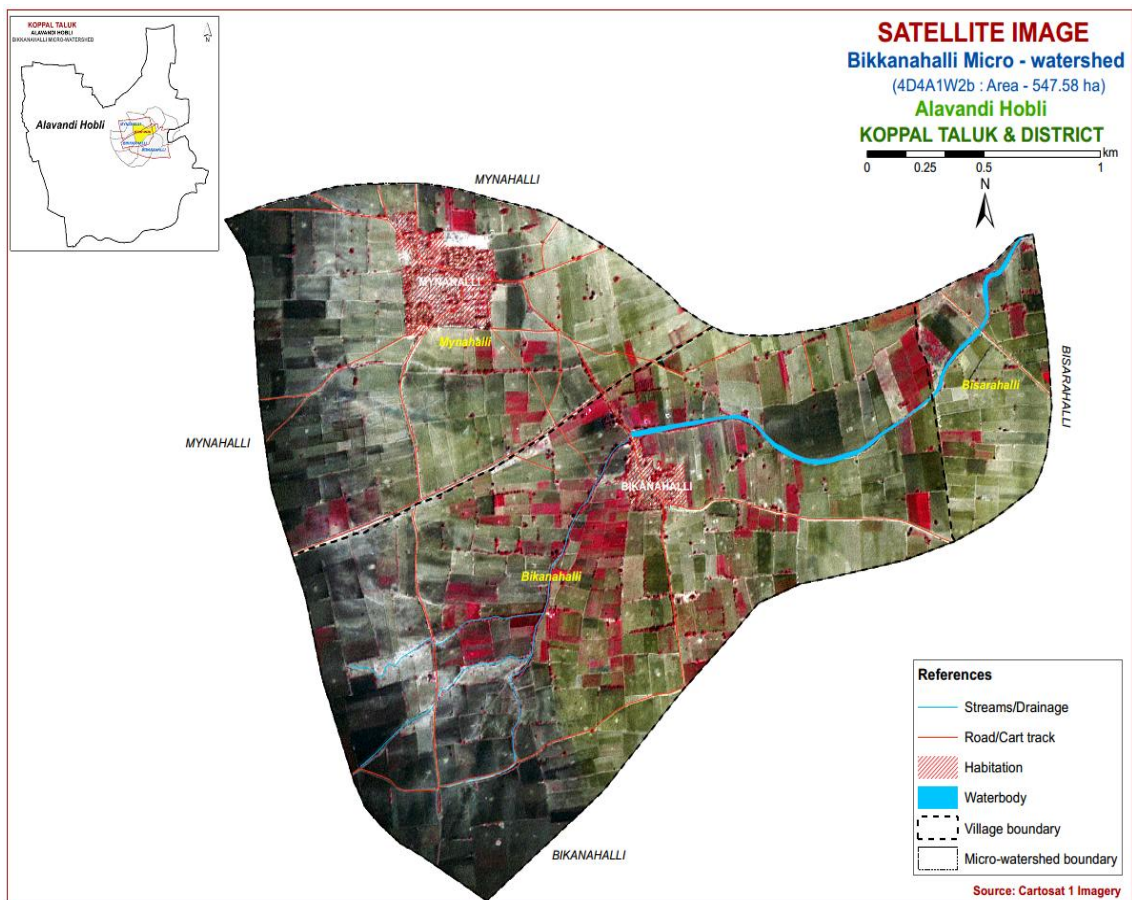


Fig.3.2 Satellite Image of Bikkanahalli Microwatershed

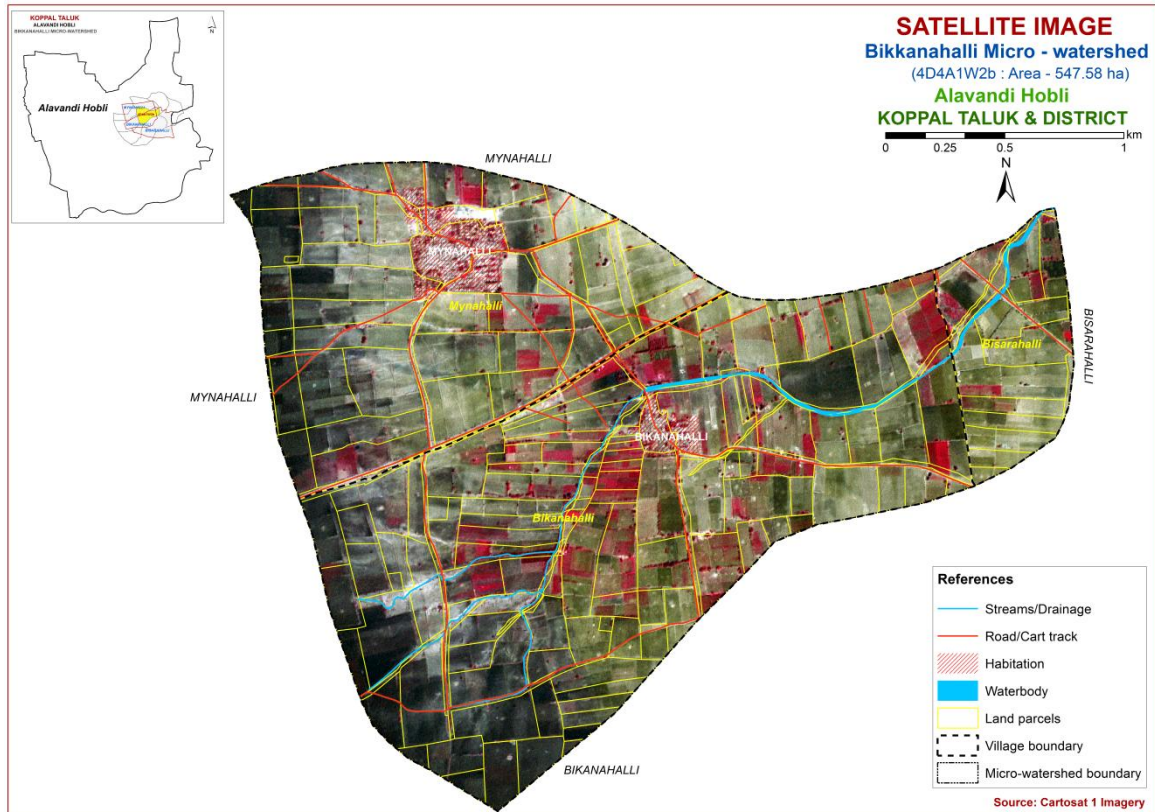


Fig.3.3 Cadastral map overlaid on IRS PAN+LISS IV merged imagery of Bikkanahalli Microwatershed

3.3 Field Investigation

The field boundaries and survey numbers given on the cadastral sheet were located on the ground by following permanent features like roads, cart tracks, *nallas*, streams, tanks etc., and wherever changes were noticed, they were incorporated on the microwatershed cadastral map. Preliminary traverse of the microwatershed was carried out with the help of cadastral map, imagery and toposheets. While traversing, landforms and physiographic units identified were checked and preliminary soil legend was prepared by studying soils at few selected places. Then, intensive traversing of each physiographic unit like hills, ridges, uplands and plains was carried out. Based on the variability observed on the surface, transects (Fig 3.4) were selected across the slope covering all the landform units in the microwatershed (Natarajan and Dipak Sarkar, 2010).

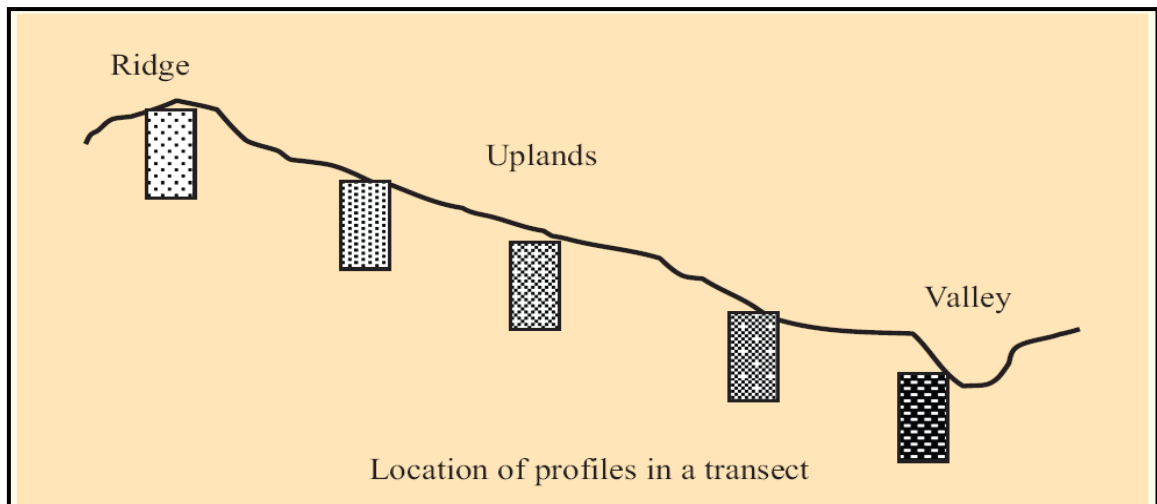


Fig: 3.4. Location of profiles in a transect

In the selected transect, soil profiles (Fig.3.4) were located at closely spaced intervals to take care of any change in the land features like break in slope, erosion, gravel, stones etc. In the selected sites, profiles (vertical cut showing the soil layers from surface to the rock) were opened upto 200 cm or to the depth limited by rock or hard substratum and studied in detail for all their morphological and physical characteristics. The soil and site characteristics were recorded for all profile sites on a standard proforma as per the guidelines given in USDA Soil Survey Manual (Soil Survey Staff, 2012). Apart from the transect study, profiles were also studied at random, almost like in a grid pattern, outside the transect areas to validate the soil map unit boundaries.

Based on the soil characteristics, the soils were grouped into different soil series. Soil series is the most homogeneous unit having similar horizons and properties and behaves similarly for a given level of management. Soil depth, texture, colour, kind of horizon and horizon sequence, amount and nature of gravel present, calcareousness, nature of substratum etc, were used as the major differentiating characteristics for identifying soil series occurring in the area. The differentiating characteristics used for identifying the soil series are given in Table 3.1. Based on the above characteristics, 17 soil series were identified in Bikkanahalli microwatershed.

**Table 3.1 Differentiating Characteristics used for identifying Soil Series
(Characteristics are of Series Control Section)**

| Soils of Granite Gneiss Landscape | | | | | | | |
|--|---------------------|-------------------|--|----------------|-------------------|-------------------------|-----------------------|
| Sl. No | Soil Series | Depth (cm) | Colour (moist) | Texture | Gravel (%) | Horizon sequence | Calcareousness |
| 1 | Harve (HRV) | 25-50 | 2.5YR3/4,3/6 5YR3/3,4/4,3/4 | gscl | >35 | Ap-Bt-Cr | - |
| 2 | Lakkur (LKR) | 50-75 | 2.5YR 2.5/3, 2.5/4, 3/4, 3/6 | gsc | 40-60 | Ap-Bt- Bc-Cr | - |
| 3 | Mukhadahalli (MKH) | 50-75 | 5YR3/3,3/4,4/3, 5/4,6/6 2.5YR3/4 | gscl | >35 | Ap-Bt-Cr | - |
| 4 | Kethanapura (KTP) | 50-75 | 2.5YR3/4,3/6 | scl | 15-35 | Ap-Bt-Cr | - |
| 5 | Bisarahalli (BSR) | 75-100 | 5 YR 3/3, 3/4 | gsc | 15-35 | Ap-Bt-Cr | - |
| 6 | Hooradhahalli (HDH) | 75-100 | 2.5YR2.5/4,3/4, 3/6 | gsc-gc | >35 | Ap-Bt-Cr | - |
| 7 | Bidanagere (BDG) | 75-100 | 5YR3/3,3/4,4/3,5/4 2.5YR3/4 | gc | 35-60 | Ap-Bt-Cr | - |
| 8 | Kumchahalli (KMH) | 100-150 | 2.5YR3/4,3/6 | sc | <15 | Bt-Cr | - |
| 9 | Balapur (BPR) | 100-150 | 2.5YR2.5/4,3/4 | gsc-gc | >35 | Ap-Bt-Cr | - |
| 10 | Niduvalalu (NDL) | >150 | 2.5YR2.5/3,2.5/4, 3/3,4/6 | gsc | >35 | Ap-Bt | - |
| 11 | Ranatur (RTR) | >150 | 2.5YR2.5/3,2.5/4, 3/3,4/6 | c | <15 | Ap-Bt | - |
| Soils of Alluvial Landscape | | | | | | | |
| 12 | Muttal (MTL) | 25-50 | 10YR 3/2, 3/3, 4/2 7.5YR3/2,3/3,6/4 | gc | 15-35 | Ap-Bw- Ck | e-ev |
| 13 | Dambarahalli (DRL) | 75-100 | 10YR 2/1, 3/1, 4/3 | c | <15 | Ap-Bw- Ck | e-es |
| 14 | Narasapura (NSP) | 75-100 | 10YR 3/1, 3/2, 4/2 | c | <15 | Ap-Bw- Cr | e-es |
| 15 | Gatareddihal (GRH) | 100-150 | 10YR 2/1, 3/1, 2.5Y 4/3, 5/4 | c | <15 | Ap-Bw- BC-C | es |
| 16 | Kadagathur (KDT) | >150 | 10YR 3/1, 3/2, 3/3 7.5YR3/3,3/4 | sc-c | <15 | Ap-Bw | - |
| 17 | Bardur (BDR) | >150 | 10YR 2/1, 3/1, 3/2 | c | <15 | Ap-Bss | es |

3.4 Soil Mapping

The area under each soil series was further separated into soil phases and their boundaries delineated on the cadastral map based on the variations observed in the texture of the surface soil, slope, erosion, presence of gravel, stoniness etc. A soil phase is a subdivision of soil series based mostly on surface features that affect its use and management. The soil mapping units are shown on the map (Fig.3.5) in the form of symbols. During the survey many soil profile pits, few mini pits and a few auger bores representing different landforms occurring in the microwatershed were studied. In

addition to the profile study, spot observations in the form of mini pits, road cuts, terrace cuts etc., were studied to validate the soil boundaries on the soil map.

The soil map shows the geographic distribution of 26 mapping units representing 17 soil series occurring in the microwatershed. The soil map unit (soil legend) description is presented in Table 3.2. The soil phase map (management units) shows the distribution of 26 phases mapped in the microwatershed. Each mapping unit (soil phase) delineated on the map has similar soil and site characteristics. In other words, all the farms or survey numbers included in one soil phase will have similar management needs and have to be treated accordingly.

3.5 Land Management Units

The 26 soil phases identified and mapped in the microwatershed were regrouped into five Land Management Units (LMU's) for the purpose of preparing a Proposed Crop Plan for sustained development of the microwatershed. The database (soil phases) generated under LRI was utilized for identifying Land Management Units (LMU's) based on the management needs. One or more than one soil site characteristic having influence on the management have been chosen for identification and delineation of LMU's. For Bikkanahalli microwatershed, five soil and site characteristics, namely the soil depth, soil texture, slope, erosion and gravel content have been considered for defining LMU's. The land use classes are expected to behave similarly for a given level of management.

3.6 Laboratory Characterization

Soil samples for each series were collected from representative master profiles for laboratory characterization by following the methods outlined in the Laboratory Manual (Sarma *et al*, 1987). Surface soil samples collected in the year 2017 from farmer's fields in Bikkanahalli microwatershed (52 samples) for fertility status (major and micronutrients) at 320 m grid interval were analyzed in the laboratory (Katyal and Rattan, 2003). By linking the soil fertility data to the survey numbers through GIS, soil fertility maps were generated using Kriging method for the microwatershed.

Table 3.2 Soil map unit description of Bikkanahalli Microwatershed

| Soil map unit No* | Soil Series | Soil Phase | Mapping Unit Description | Area in ha (%) |
|--|-------------|------------|--|-----------------|
| Soils of Granite gneiss Landscape | | | | |
| | HRV | | Harve soils are shallow (25-50 cm), well drained, dark red to dark reddish brown, red gravelly sandy clay loam soils occurring on nearly level to gently sloping uplands under cultivation | 40 (7.2) |
| 30 | | HRViB1g2 | Sandy clay surface, slope 1-3%, slight erosion, very gravelly (35-60%) | 16 (2.84) |
| 31 | | HRViB2g1 | Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 24 (4.36) |

| Soil map unit No* | Soil Series | Soil Phase | Mapping Unit Description | Area in ha (%) |
|-------------------|-------------|------------|---|--------------------|
| | LKR | | Lakkur soils are moderately shallow (50-75 cm), well drained, have dark reddish brown to dark red, red gravelly sandy clay soils occurring on very gently to moderately sloping uplands under cultivation | 0.08 (0.01) |
| 43 | | LKRcB2g1 | Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 0.08 (0.01) |
| | MKH | | Mukhadahalli soils are moderately shallow (50-75 cm), well drained, have dark brown to reddish brown gravelly red sandy clay loam soils occurring on gently very gently to gently sloping uplands under cultivation | 51 (9.28) |
| 85 | | MKHhB2g1 | Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 38 (6.98) |
| 90 | | MKHhB2g1 | Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 13 (2.3) |
| | KTP | | Kethanapura soils are moderately shallow (50-75 cm), well drained, have dark reddish brown red sandy clay loam soils occurring on very gently sloping uplands under cultivation | 5 (0.87) |
| 74 | | KTPiB1g1 | Sandy clay surface, slope 1-3%, slight erosion, gravelly (15-35%) | 5 (0.87) |
| | BSR | | Bisarahalli soils are moderately deep (75-100 cm), well drained, have dark reddish brown red gravelly sandy clay soils occurring on very gently sloping uplands under cultivation | 52 (9.38) |
| 165 | | BSRiB1g1 | Sandy clay surface, slope 1-3%, slight erosion, gravelly (15-35%) | 23 (4.16) |
| 168 | | BSRiB2g1 | Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 29 (5.22) |
| | HDH | | Hooradhahalli soils are moderately deep (75-100 cm), well drained, dark red to dark reddish brown, red gravelly sandy clay to clay soils occurring on nearly level to moderately sloping uplands under cultivation | 18 (3.18) |
| 111 | | HDHcB2g1 | Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 13 (2.29) |
| 128 | | HDHiB2g1 | Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 5 (0.89) |
| | BDG | | Bidanagere soils are moderately deep (75-100 cm), well drained, have dark reddish brown gravelly red clay soils occurring on nearly level to gently sloping uplands under cultivation | 3 (0.54) |
| 181 | | BDGcB1g2 | Sandy loam surface, slope 1-3%, slight erosion, very gravelly (35-60%) | 3 (0.54) |
| | KMH | | Kumchahalli soils are deep (100-150cm), well drained, have dark reddish brown to dark red sandy clay soils occurring on nearly level to very gently sloping uplands under cultivation | 84 (15.44) |

| Soil map unit No* | Soil Series | Soil Phase | Mapping Unit Description | Area in ha (%) |
|------------------------------------|-------------|--|---|-------------------|
| 199 | | KMHiA1 | Sandy clay surface, slope 0-1%, slight erosion, | 19 (3.52) |
| 200 | | KMHiB1 | Sandy clay surface, slope 1-3%, slight erosion | 23 (4.21) |
| 202 | | KMHiB2g1 | Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 42 (7.71) |
| | BPR | Balapur soils are deep (100-150 cm), well drained, have dark reddish brown to dark red gravelly sandy clay to clay soils occurring on nearly level to gently sloping uplands under cultivation | | 61 (11.21) |
| 229 | | BPRhB1g1 | Sandy clay loam surface, slight erosion, gravelly (15-35%) | 17 (3.15) |
| 237 | | BPRiB1 | Sandy clay surface, slope 1-3%, slight erosion | 28 (5.16) |
| 238 | | BPRiB1g1 | Sandy clay surface, slope 1-3%, slight erosion, gravelly (15-35%) | 16 (2.9) |
| | NDL | Niduvalalu soils are very deep (>150 cm), well drained, have red to dark reddish brown red gravelly sandy clay soils occurring on nearly level to very gently sloping uplands under cultivation | | 23 (4.25) |
| 299 | | NDLiB1g1 | Sandy clay surface, slope 1-3%, slight erosion, gravelly (15-35%) | 23 (4.25) |
| | RTR | Ranatur soils are very deep (>150 cm), well drained, have dark reddish brown to dark red clay soils occurring on nearly level to very gently sloping uplands under cultivation | | 12 (2.15) |
| 288 | | RTRiB2 | Sandy clay surface, slope 1-3%, moderate erosion | 12 (2.15) |
| Soils of Alluvial Landscape | | | | |
| | MTL | Muttal soils are shallow (25-50 cm), well drained, have very dark grayish brown to dark brown, calcareous black gravelly clay soils occurring on nearly level to gently sloping plains under cultivation | | 50 (9.06) |
| 311 | | MTLmB2g1 | Clay surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 50 (9.06) |
| | DRL | Dambarahalli soils are moderately deep (75-100 cm), moderately well drained, have dark brown to very dark gray, calcareous black cracking clay soils occurring on nearly level to very gently sloping plains under cultivation | | 9 (1.7) |
| 351 | | DRLmB2g1 | Clay surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 9 (1.7) |
| | NSP | Narasapura soils are moderately deep (75-100 cm), moderately well drained, have dark grayish brown to very dark grayish brown and very dark gray, black calcareous | | 5 (0.95) |

| Soil map unit No* | Soil Series | Soil Phase | Mapping Unit Description | Area in ha (%) |
|-------------------|-------------|------------|---|--------------------|
| | | | cracking clay soils occurring on nearly level to very gently sloping plains under cultivation | |
| 362 | | NSPmB2 | Clay surface, slope 1-3%, moderate erosion | 5 (0.95) |
| | GRH | | Gatareddihal soils are deep (100-150 cm), moderately well drained, have light olive brown to very dark gray, calcareous black cracking clay soils occurring on nearly level to very gently sloping plains under cultivation | 102 (18.45) |
| 370 | | GRHmA1 | Clay surface, slope 0-1%, slight erosion | 43 (7.77) |
| 373 | | GRHmB2 | Clay surface, slope 1-3%, moderate erosion | 59 (10.68) |
| | KDT | | Kadagathur soils are very deep (>150 cm), moderately well drained, have dark brown to very dark grayish brown, sandy clay to clay black soils occurring on nearly level to very gently sloping plains under cultivation | 10 (1.76) |
| 403 | | KDTmA1 | Clay surface, slope 0-1%, slight erosion | 10 (1.76) |
| | BDR | | Bardur soils are very deep (>150 cm), moderately well drained, have very dark grayish brown to very dark gray, black cracking calcareous clay soils occurring on nearly level to very gently sloping plains under cultivation | 4 (0.65) |
| 433 | | BDRmB2 | Clay surface, slope 1-3%, moderate erosion | 4 (0.65) |
| 1000 | | Others | Habitation and waterbody | 21 (3.92) |

*Soil map unit numbers are continuous for the taluk, not the microwatersheds

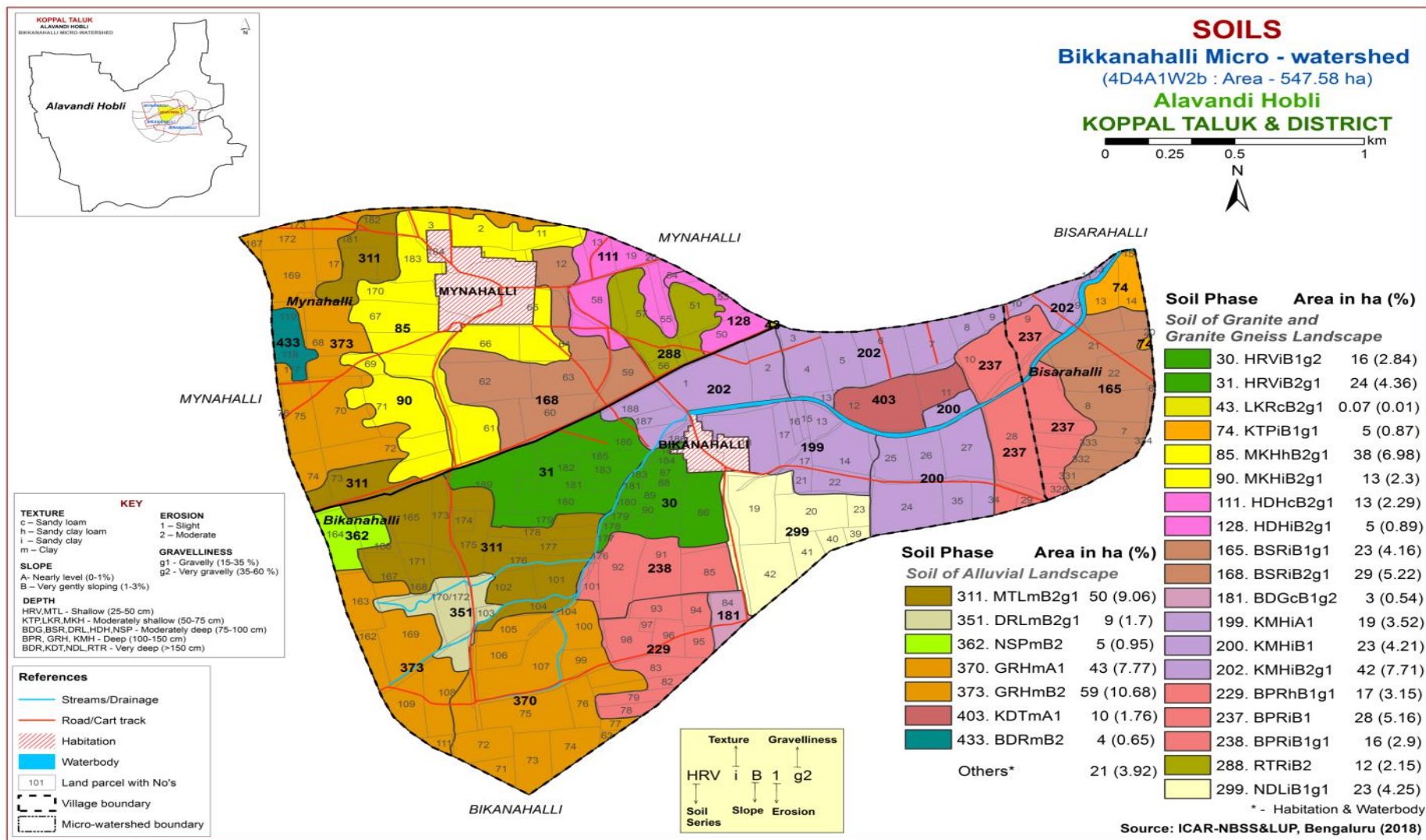


Fig 3.5 Soil Phase or Management Units of Bikkanahalli Microwatershed

THE SOILS

Detailed information pertaining to the nature, extent and distribution of different kinds of soils occurring in Bikkanahalli microwatershed is provided in this chapter. The microwatershed area has been identified as granite gneiss and alluvial landscapes based on geology. In all, 17 soil series were identified. Soil formation is the result of the combined effect of environmental and terrain factors that are reflected in soil morphology. The soil formation is dominantly influenced by the parent material, climate, time and relief.

A brief description of each of the 17 soil series identified followed by 26 soil phases (management units) mapped (Fig. 3.5) are furnished below. The physical and chemical characteristics of soil series identified in Bikkanahalli microwatershed are given in Table 4.1 along with soil classification. The soils in any one map unit differ from place to place in their depth, texture, slope, gravelliness, erosion or any other site characteristic that affect management. The soil phase map can be used for identifying the suitability of areas for growing specific crops or for other alternative uses and also for deciding the type of conservation structures needed. The detailed information on soil and site-characteristics like soil depth, surface soil texture, slope, erosion, gravelliness, AWC, LCC etc, with respect to each of the soil phase identified is given village/survey number wise for the microwatershed in Appendix-I.

4.1 Soils of Granite and Granite gneiss Landscape

In this landscape, 11 soil series were identified and mapped. Of these series, KMH series occupies maximum area of 84 ha (15%) followed by BPR 61 ha (11%), BSR 52 ha (9%), MKH 51 ha (9%), HRV 40 ha (7%), NDL 23 ha (4%), HDH 18 ha (3%), RTR 12 ha (2%), KTP 5 ha (1%), BDG 3 ha (1%) and LKR < 1 ha (<1%). The brief description of the soil series along with the soil phases identified and mapped is given below.

4.1.1 Harve (HRV) Series: Harve soils are shallow (25-50 cm), well drained, have reddish brown to dark red gravelly sandy clay loam soils. They have developed from granite gneiss and occur on very gently to moderately sloping uplands. The Harve series has been classified as a member of the loamy-skeletal, mixed, isohyperthermic family of (Paralithic) Rhodustalfs.

The thickness of the solum ranges from 28 to 48 cm. The thickness of A-horizon ranges from 12 to 17 cm. Its colour is in 5YR and 2.5 YR hue with value 3 to 4 and chroma 4 to 6. The texture varies from loamy sand to sandy loam with 20 to 60 per cent gravel. The thickness of B-horizon ranges from 16 to 32 cm. Its colour is in 2.5 YR and 5 YR hue with value 3 to 4 and chroma 4 to 6. Its texture is sandy clay loam with gravel content of more than 35 per cent. The available water capacity is very low (<50 mm/m). Two soil phases were identified and mapped.



Landscape and soil profile characteristics of Harve (HRV) Series

4.1.2 Lakkur (LKR) Series: Lakkur soils are moderately shallow (50-75cm), well drained, have reddish brown to dark red gravelly sandy clay soils. They have developed from weathered granite gneiss and occur on nearly level to very gently and gently sloping uplands. The Lakkur series has been classified as a member of the clayey-skeletal, mixed, isohyperthermic family of Typic Rhodustalfs.

The thickness of the solum ranges from 51 to 74 cm. The thickness of A horizon ranges from 12 to 18 cm. Its colour is in 5YR and 2.5 YR hue with value 3 to 4 and chroma 4 to 6. The texture varies from loamy sand to sandy clay loam with 15 to 50 per cent gravel. The thickness of B horizon ranges from 39 to 58 cm. Its colour is in 2.5 YR hue with value 3 to 4 and chroma 4 to 6. Texture is sandy clay with 40 to 60 per cent gravel. The available water capacity is very low (<50 mm/m). Only one soil phase was identified and mapped.



Landscape and soil profile characteristics of Lakkur (LKR) Series

4.1.3 Mukhadahalli (MKH) Series: Mukhadahalli soils are moderately shallow (50-75 cm), well drained, have dark brown to reddish brown gravelly sandy clay soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands. The Mukhadahalli series has been classified as a member of the clayey-skeletal, mixed, isohyperthermic family of Typic Haplustalfs.

The thickness of the solum ranges from 51 to 72 cm. The thickness of A horizon ranges from 12 to 17 cm. Its colour is in 5 YR and 7.5 YR hue with value 3 to 4 and chroma 2 to 4. The texture varies from loamy sand to sandy loam with 20 to 45 per cent gravel. The thickness of B horizon ranges from 40 to 68 cm. Its colour is in 2.5 YR and 5 YR hue with value and chroma 3 to 6. Texture is sandy clay loam to sandy clay with 35 to 50 per cent gravel. The available water capacity is very low (<50 mm/m). Two soil phases were identified and mapped.



Landscape and soil profile characteristics of Mukhadahalli (MKH) Series

4.1.4 Kethanapura (KTP) Series: Kethanapura soils are moderately shallow (50-75cm), well drained, have dark reddish brown sandy clay soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands. The Kethanapura series has been classified as a member of the Fine, mixed, isohyperthermic family of Rhodic Paleustalfs.

The thickness of the solum ranges from 53 to 72 cm. The thickness of A-horizon ranges from 11 to 16 cm. Its colour is in 5YR and 2.5 YR hue with value 3 to 4 and chroma 3 to 6. The texture varies from loamy sand to sandy clay loam with 15 to 40 per cent gravel. The thickness of B-horizon varies from 41 to 56 cm. Its colour is in 2.5 YR hue with value 3 to 4 and chroma 4 to 6. Texture is dominantly sandy clay with 15 to 35 per cent gravel. The available water capacity is low (51-100 mm/m). Only one soil phase was identified and mapped.



Landscape and soil profile characteristics of Kethanapura (KTP) Series

4.1.5 Bisarahalli (BSR) Series: Bisarahalli soils are moderately deep (75-100 cm), well drained, have dark reddish brown gravelly sandy clay red soils. They have developed from weathered granite gneiss and occur on very gently sloping uplands under cultivation. The Bisarahalli series has been classified as a member of the fine, mixed, isohyperthermic family of Typic Paleustalfs

The thickness of the solum ranges from 75 to 98 cm. The thickness of A horizon ranges from 17 to 25 cm. Its colour is in 5 YR hue with value 3 to 4 and chroma 3 to 6. The texture ranges from sandy clay loam to sandy clay with 15 to 35 per cent gravel. The thickness of B horizon ranges from 61 to 79 cm. Its colour is in 5 YR hue with value 3 and chroma 3 to 4. Its texture is gravelly sandy clay with gravel content of 15-35 per cent. The available water capacity is low (51-100 mm/m). Two soil phases were identified and mapped.



Landscape and soil profile characteristics of Bisarahalli (BSR) Series

4.1.6 Hooradhahalli (HDH) Series: Hooradhahalli soils are moderately deep (75-100 cm), well drained, have red to dark red and reddish brown gravelly sandy clay to clay soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands. The Hooradhahalli series has been classified as a member of the clayey-skeletal, mixed, isohyperthermic family of Rhodic Paleustalfs.

The thickness of the solum ranges from 76 to 100 cm. The thickness of A horizon ranges from 11 to 19 cm. Its colour is in 5 YR and 2.5 YR hue with value 3 to 4 and chroma 3 to 6. The texture varies from loamy sand to sandy clay with 15 to 50 per cent gravel. The thickness of B horizon varies from 65 to 83 cm. Its colour is in 2.5 YR hue with value 2.5 to 3 and chroma 4 to 6. Texture is sandy clay to clay with 35 to 50 per cent gravel. The available water capacity is low (51-100 mm/m). Two soil phases were identified and mapped.



Landscape and soil profile characteristics of Hooradhahalli (HDH) Series

4.1.7 Bidanagere (BDG) Series: Bidanagere soils are moderately deep (75-100 cm), well drained, have dark reddish brown gravelly clay soils. They have developed from weathered granite gneiss and occur on very gently sloping uplands under cultivation. The Bidanagere series has been classified as a member of the clayey-skeletal, mixed, isohyperthermic family of Rhodic Paleustalfs.

The thickness of the solum ranges from 78 to 99 cm. The thickness of A-horizon ranges from 12 to 19 cm. Its colour is in 2.5 YR and 5 YR hue with value 2 to 3 and chroma 3 to 4. The texture varies from sandy clay loam to sandy clay with 10 to 20 per cent gravel. The thickness of B-horizon ranges from 68 to 85 cm. Its colour is in 5 YR and 2.5 YR hue with value 3 to 5 and chroma 3 to 4. Its texture is gravelly clay with gravel content of 35-60 per cent. The available water capacity is low (51-100 mm/m). Only one soil phase was identified and mapped.



Landscape Soil Profile Characteristics of Bidanagere (BDG) Series

4.1.8 Kumchahalli (KMH) Series: Kumchahalli soils are deep (100-150cm), well drained, have dark reddish brown to dark red sandy clay soils. They have developed from granite gneiss and occur on nearly level to very gently sloping uplands. The Kumchahalli series has been classified as a member of the fine mixed, isohyperthermic family of Typic Rhodustalfs.

The thickness of the solum ranges from 102 to 150 cm. The thickness of surface horizon ranges from 11 to 23 cm. Its colour is in 5 YR and 2.5 YR hue with value 2.5 to 3 and chroma 3 to 6. The texture is dominantly sandy clay. The thickness of B horizon ranges from 95 to 132 cm. Its colour is in 2.5 YR hue with value 3 and chroma 4 to 6. Its texture is dominantly sandy clay loam to sandy clay. The available water capacity is medium (101-150 mm/m). Three soil phases were identified and mapped.



Landscape and soil profile characteristics of Kumchahalli (KMH) Series

4.1.9 Balapur (BPR) Series: Balapur soils are deep (100-150 cm), well drained, have dark reddish brown to dark red gravelly sandy clay to clay soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands. The Balapur series has been classified as a member of the clayey-skeletal, mixed, isohyperthermic family of Typic Rhodustalfs

The thickness of the solum ranges from 102 to 147 cm. The thickness of A horizon ranges from 12 to 17cm. Its colour is in 5 YR and 2.5 YR hue with value and chroma 3 to 4. The texture ranges from loamy sand to sandy clay with 15 to 50 per cent gravel. The thickness of B horizon ranges from 90 to 132 cm. Its colour is in 2.5 YR hue with value 2.5 to 3 and chroma 4 to 6. Texture is sandy clay to clay with 35 to 50 per cent gravel. The available water capacity is low (51-100 mm/m). Three soil phases were identified and mapped.



Landscape Soil Profile Characteristics of Balapur (BPR) Series

4.1.10 Niduvalalu (NDL) Series: Niduvalalu soils are very deep (>150 cm), well drained, have dark red and dark reddish brown gravelly sandy clay soils. They have developed from weathered granite gneiss and occur on nearly level to very gently sloping uplands under cultivation. The Niduvalalu series has been classified as a member of the clayey –skeletal, mixed, isohyperthermic family of Rhodic Paleustalfs.

The thickness of the solum is more than 150 cm. The thickness of A-horizon ranges from 11 to 15 cm. Its colour is in 5 YR hue with value 3 to 4 and chroma 4 to 6. The texture varies from sandy loam to sandy clay loam with 10 to 30 per cent gravel. The thickness of B-horizon ranges from 150 to 160 cm. Its colour is in 2.5 YR hue with value 2.5 to 4 and chroma 4 to 6. Its texture is sandy clay and ranges from gravelly sandy clay with 20 to 75 per cent gravel. The available water capacity is low (51-100 mm/m). Only one soil phases was identified and mapped.



Landscape Soil Profile Characteristics of Niduvalalu (NDL) Series

4.1.11 Ranatur (RTR) Series: Ranatur soils are very deep (> 150 cm), well drained, have dark reddish brown to dark red clayey soils. They have developed from granite gneiss and occur on very gently sloping uplands. The Ranatur series has been classified as a member of the fine, mixed, isohyperthermic family of Rhodic Paleustalfs.

The thickness of the solum is more than 150 cm. The thickness of A horizon ranges from 8 to 14 cm. Its colour is in 5 YR and 2.5 YR hue with value 2.5 to 4 and chroma 3 to 6. The texture varies from sandy loam to sand clay. The thickness of B horizon is more than 150 cm. Its colour is in 2.5 YR hue with value 2.5 to 3 and chroma 3 to 6. Its texture is clay. The available water capacity is high (100-150 mm/m). Only one soil phases was identified and mapped.



Landscape and soil profile characteristics of Ranatur (RTR) Series

4.2 Soils of Alluvial Landscape

In this landscape, 6 soil series were identified and mapped. Of these series, GRH series occupies maximum area of 102 ha (19%) followed by MTL 50 ha (9%), KDT 10 ha (2%), DRL 9 ha (2%), NSP 5 ha (1%) and BDR 4 ha (1%). The brief description of the soil series along with the soil phases identified and mapped is given below.

4.2.1 Muttal (MTL) Series: Muttal soils are shallow (25-50 cm), well drained, have dark brown to very dark grayish brown, calcareous gravelly clay soils. They have developed from alluvium and occur on nearly level to very gently sloping uplands. The Muttal series has been classified as a member of the clayey, mixed, isohyperthermic (Calc) family of (Paralithic) Haplustepts.

The thickness of the solum ranges from 30 to 48 cm. The thickness of A horizon ranges from 15 to 18 cm. Its colour is in 7.5 YR and 10 YR hue with value 2 to 3 and chroma 2.5 to 4. The texture varies from sandy clay to clay with 10 to 15 per cent gravel. The thickness of B horizon ranges from 18 to 32 cm. Its colour is in 10 YR and 7.5 YR hue with value 2 to 6 and chroma 2 to 4. Its texture is sandy clay to clay and are calcareous. The available water capacity is low (51-100 mm/m). Only one soil phase was identified and mapped.



Landscape and soil profile characteristics of Muttal (MTL) Series

4.2.2 Dambarahalli (DRL) Series: Dambarahalli soils are moderately deep (75-100 cm), moderately well drained, have black and very dark gray to dark brown calcareous cracking clay soils. They have developed from alluvium and occur on very gently to gently sloping uplands under cultivation. The Dambarahalli series has been classified as a member of the very fine, smectitic, isohyperthermic (calc) family of Typic Haplusterts.

The thickness of the solum ranges from 75 to 99 cm. The thickness of A horizon ranges from 13 to 24 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 1 to 2. The texture is clay. The thickness of B horizon ranges from 54 to 85 cm. Its colour is in 10 YR hue with value 2 to 4 and chroma 1 to 3. Its texture is clay and is calcareous. The

available water capacity is high (151-200 mm/m). One soil phase was identified and mapped. Only one soil phase was identified and mapped.



Landscape and soil profile characteristics of Dambarahalli (DRL) Series

4.2.3 Narsapura (NSP) series: Narsapura soils are moderately deep (75-100 cm), moderately well drained, have dark grayish brown to very dark grayish brown and very dark gray, black calcareous cracking clay soils. They have developed from alluvium and occur on very gently sloping uplands. The Narsapura series has been classified as a member of the very fine, smectitic, isohyperthermic (calc) family of Vertic Haplustepts.

The thickness of the solum is 76 to 98 cm. The thickness of A horizon ranges from 15 to 19 cm. Its colour is in 10 YR hue with value 3 and chroma 1 to 2. The texture is clay with no gravel. The thickness of B horizon ranges from 57 to 83 cm. Its colour is in 10 YR hue with value 3 to 5 and chroma 1 to 3. Its texture is clay and are calcareous. The available water capacity is medium (101-150 mm/m). Only one soil phase was identified and mapped.



Landscape and soil profile characteristics of Narsapura (NSP) series

4.2.4 Gatareddihal (GRH) Series: Gatareddihal soils are deep (100-150 cm), moderately well drained have black or dark grey to light olive brown calcareous sodic clay soils. They are developed from alluvium and occur on nearly level to very gently sloping uplands under cultivation. The Gatareddihal soil series has been classified as member of the very fine, smectitic, isohyperthermic (calc) family of Sodic Haplusterts.

The thickness of the solum ranges from 102 to 149 cm. The thickness of A-horizon ranges from 12 to 19 cm. Its colour is in 7.5 YR, 10 YR hue with value 3 to 4 and chroma 1 to 6. The texture is sandy clay loam to clay. The thickness of B-horizon ranges from 86 to 117 cm. Its colour is in 10 YR and 7.5 YR hue with value 3 and chroma 2 to 6. Texture is clay with less than 15 per cent gravel and are calcareous. The available water capacity is very high (>200 mm/m). Two soil phases were identified and mapped.



Landscape and soil profile characteristics of Gatareddihal (GRH) Series

4.2.5 Kadagathur (KDT) Series: Kadagathur soils are very deep (>150 cm), moderately well drained, have dark brown to very dark grayish brown sandy clay to clay soils. They have developed from alluvium and occur on nearly level to very gently sloping uplands under cultivation. The Kadagathur series has been classified as a member of the fine, mixed, isohyperthermic family of Fluventic Haplustepts .

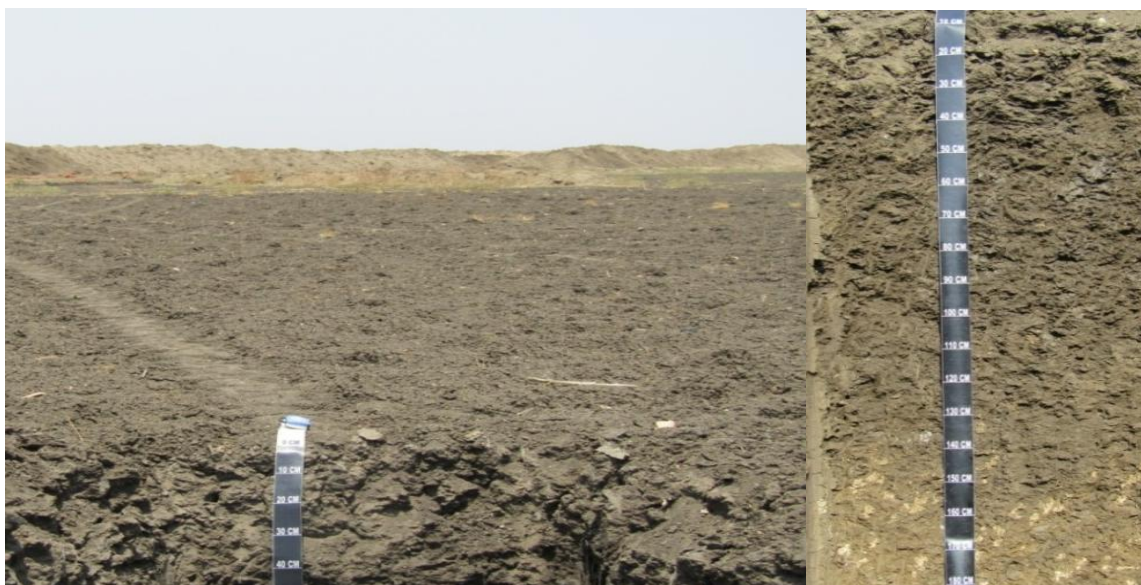
The thickness of the solum is more than 150 cm. The thickness of A horizon ranges from 8 to 14 cm. Its colour is in 10 YR hue with value 3 and chroma 4. The texture varies is sandy loam. The thickness of B horizon is more than 150 cm. Its colour is in 10 YR and 7.5 YR hue with value 3 and chroma 1 to 4. Its texture is sandy clay to clay. The available water capacity is very high (>200 mm/m). Only one soil phase was identified and mapped.



Landscape and soil profile characteristics of Kadagathur (KDT) Series

4.2.6 Bardur (BDR) Series: Bardur soils are very deep (>150 cm), moderately well drained, have very dark grayish brown to very dark gray, black calcareous cracking clay soils. They are developed from alluvium and occur on nearly level to very gently sloping plains under cultivation. The Bardur series has been classified as a member of the very fine, smectitic, (calcareous) isohyperthermic family of Typic Haplusterts.

The thickness of the solum is more than 150 cm. The thickness of A horizon ranges from 15 to 19 cm. Its colour is in 10 YR hue with value 2 and chroma 1 with clay texture. The thickness of B horizon ranges from 146 to 180 cm. Its colour is in 10 YR hue with value 2 to 3 and chroma 1 to 2. Its texture is clay and is calcareous with less than 15 per cent gravel. The available water capacity is very high (>200 mm/m). Only one soil phase was identified and mapped.



Landscape and soil profile characteristics of Bardur (BDR) Series

Table: 4.1 Physical and Chemical Characteristics of Soil Series identified in Bikkanahalli microwatershed

Series Name: Harve (HRV) **Pedon:** R-10

Location: 15°25'11.63"N, 76°22'03.65"E Jabbaragudda village, Koppal Taluk and District

Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Loamy-skeletal, mixed isohyperthermic, (Paralithic) Rhodustalfs

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-15 | Ap | 65.64 | 9.07 | 25.28 | 29.04 | 12.99 | 9.00 | 3.48 | 11.15 | 50 | scl | 12.87 | 4.81 |
| 15-29 | Bt1 | 56.13 | 7.75 | 36.12 | 27.81 | 11.43 | 7.21 | 1.44 | 8.24 | 60 | sc | 15.69 | 6.24 |
| 29-47 | Bt2 | 63.42 | 6.53 | 30.05 | 32.38 | 13.93 | 7.48 | 5.74 | 3.89 | 60 | scl | 15.41 | 9.29 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) | O.C. | CaCO ₃ | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation | ESP | | | |
|------------|------------|-------------------|-------|--------------|------|-------------------|--------------------|------|------|------|-------|-------|----------|-----------------|------|---|----|-------|
| | Water | CaCl ₂ | M KCl | | | | dS m ⁻¹ | % | % | Ca | Mg | | | | | K | Na | Total |
| | | | | | | | | | | | | | | | | | | |
| 0-15 | 6.05 | - | - | 0.21 | 0.93 | - | 8.89 | 1.96 | 0.50 | 0.08 | 11.43 | 11.24 | 0.44 | 100.00 | 0.73 | | | |
| 15-29 | 5.99 | - | - | 0.15 | 0.29 | - | 9.72 | 2.75 | 0.51 | 0.09 | 13.07 | 12.71 | 0.35 | 100.00 | 0.74 | | | |
| 29-47 | 6.07 | - | - | 0.11 | 0.38 | - | 9.35 | 2.47 | 0.49 | 0.06 | 12.36 | 12.71 | 0.42 | 97.29 | 0.44 | | | |

Contd...

Soil Series: Lakkur (LKR), **Pedon:** RM-8.

Location: 15°04'26.3"N, 75°37'84.1"E, (4D4A3I1f), Belhatti village, Shirahatti taluk, Gadag district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey-skeletal, mixed, isohyperthermic Typic Rhodustalfs

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-21 | Ap | 74.00 | 8.34 | 17.66 | 9.62 | 11.57 | 15.76 | 23.13 | 13.92 | 20 | sl | - | - |
| 21-35 | Bt | 54.37 | 10.48 | 35.14 | 16.33 | 8.64 | 9.69 | 11.59 | 8.11 | 40 | sc | - | - |
| 35-56 | Bc | 48.37 | 13.46 | 38.17 | 10.96 | 7.69 | 9.17 | 11.28 | 9.27 | 60 | sc | - | - |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) dS m ⁻¹ | O.C. % | CaCO ₃ % | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation % | ESP % |
|------------|------------|-------------------|-------|---------------------------------|--------|---------------------|--------------------|----|------|------|-------|-------|----------|-------------------|-------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | | | | | | | | | | | | |
| 0-21 | 8.18 | - | - | 0.30 | 0.56 | 0.94 | - | - | 0.31 | 0.55 | 0.86 | 12.19 | 0.69 | 100.00 | 4.51 |
| 21-35 | 8.17 | - | - | 0.30 | 0.52 | 1.29 | - | - | 0.19 | 0.84 | 1.03 | 22.18 | 0.63 | 100.00 | 3.79 |
| 35-56 | 7.95 | - | - | 0.46 | 0.48 | 1.99 | - | - | 0.24 | 0.58 | 0.82 | 22.94 | 0.60 | 100.00 | 2.53 |

Contd...

Series Name: Mukahadahalli (MKH), **Pedon:** R-11

Location: 15°22'05.4"N, 76°04'10.3"E, Halageri village, Koppal taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bangalore **Classification:** Clayey-skeletal, mixed, isohyperthermic Typic Haplustalfs

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-19 | Ap | 65.71 | 8.83 | 25.46 | 9.27 | 9.06 | 14.42 | 21.52 | 11.43 | 70 | scl | 16.54 | 8.60 |
| 19-32 | Bt | 55.89 | 11.13 | 32.98 | 6.47 | 9.18 | 11.89 | 19.19 | 9.18 | 50 | scl | 19.24 | 12.78 |
| 32-58 | Bt | 47.95 | 10.41 | 41.63 | 17.52 | 3.78 | 9.13 | 9.55 | 7.97 | 50 | sc | 24.03 | 16.02 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) | O.C. | CaCO ₃ | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation | ESP |
|------------|------------|-------------------|-------|--------------------|------|-------------------|-----------------------|------|------|------|-------|-------|----------|-----------------|------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | dS m ⁻¹ | % | % | cmol kg ⁻¹ | | | | | % | % | | |
| 0-19 | 7.38 | - | - | 0.09 | 0.2 | 0.00 | 8.97 | 4.32 | 0.26 | 0.22 | 13.77 | 14.84 | 0.58 | 93 | 1.49 |
| 19-32 | 7.5 | - | - | 0.106 | 0.41 | 0.00 | 15.98 | 3.27 | 0.16 | 0.50 | 19.91 | 20.88 | 0.63 | 95 | 2.38 |
| 32-58 | 7.46 | - | - | 0.173 | 0.49 | 0.00 | 19.71 | 4.53 | 0.23 | 1.32 | 25.79 | 25.76 | 0.62 | 100 | 5.11 |

Contd...

Series Name: Kethanapura (KTP) **Pedon:** R-9

Location: 15°25'28.81"N, 76°22'00.76" E Jabbaragudda village, Koppal Taluk and District

Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine, mixed, isohyperthermic Rhodic Paleustalfs

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-18 | Ap | 83.64 | 10.52 | 5.84 | 25.61 | 22.36 | 15.24 | 13.52 | 6.91 | 10 | ls | 7.92 | 2.58 |
| 18-38 | Bt1 | 46.06 | 5.63 | 48.31 | 21.58 | 9.54 | 3.53 | 4.15 | 7.26 | 30 | sc | 19.62 | 14.48 |
| 38-73 | Bt2 | 52.31 | 6.91 | 40.78 | 24.56 | 12.74 | 5.96 | 5.55 | 3.49 | 30 | sc | 17.73 | 11.95 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) dS m ⁻¹ | O.C. % | CaCO ₃ % | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation % | ESP % |
|------------|------------|-------------------|-------|------------------------------------|-----------|------------------------|--------------------|------|------|------|-------|-------|----------|----------------------|----------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | | | | | | | | | | | | |
| 0-18 | 6.42 | - | | 0.07 | 1.24 | - | 2.95 | 0.93 | 0.57 | 0.02 | 4.48 | 4.41 | 0.75 | 100.00 | 0.05 |
| 18-38 | 6.63 | - | - | 0.09 | 0.70 | - | 11.71 | 3.53 | 0.98 | 0.08 | 16.31 | 16.59 | 0.34 | 98.30 | 0.50 |
| 38-73 | 6.88 | - | - | 0.15 | 0.48 | - | 11.36 | 3.30 | 0.72 | 0.13 | 15.50 | 15.75 | 0.39 | 98.42 | 0.80 |

Contd...

Series Name: Bisarahalli (BSR) **Pedon:** R-9

Location: 15°25'21.0"N, 76°11'42.0"E Hatti village, Koppal taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bangalore **Classification:** Fine, mixed isohyperthermic Typic Paleustalfs

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-14 | Ap | 70.11 | 9.29 | 20.60 | 22.31 | 15.97 | 11.98 | 9.83 | 10.03 | 20 | scl | 13.22 | 7.81 |
| 14-57 | Bt1 | 47.27 | 7.52 | 45.20 | 27.04 | 8.28 | 4.61 | 2.10 | 5.24 | 25 | sc | 16.39 | 13.31 |
| 57-80 | Bt2 | 41.93 | 8.67 | 49.40 | 21.95 | 6.83 | 4.76 | 4.66 | 3.73 | 30 | c | 21.41 | 15.41 |
| 80-99 | Bt3 | 49.02 | 9.87 | 41.11 | 19.90 | 10.78 | 6.84 | 6.42 | 5.08 | 40 | sc | 21.82 | 14.24 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) dS m ⁻¹ | O.C. % | CaCO ₃ % | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation % | ESP % |
|------------|------------|-------------------|-------|---------------------------------|--------|---------------------|--------------------|------|------|------|-------|-------|----------|-------------------|-------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | | | | | | | | | | | | |
| 0-14 | 6.59 | - | - | 0.12 | 0.73 | - | 4.47 | 1.77 | 0.06 | 0.53 | 6.82 | 8.80 | 0.43 | 77.55 | 6.00 |
| 14-57 | 7.02 | - | - | 0.04 | 0.48 | - | 5.85 | 2.31 | 0.06 | 0.20 | 8.43 | 14.70 | 0.33 | 57.32 | 1.36 |
| 57-80 | 7.00 | - | - | 0.05 | 0.28 | - | 11.74 | 2.26 | 0.08 | 0.22 | 14.31 | 15.60 | 0.32 | 91.73 | 1.44 |
| 80-99 | 6.90 | - | - | 0.06 | 0.18 | - | 13.70 | 2.16 | 0.08 | 0.14 | 16.08 | 16.50 | 0.40 | 97.44 | 0.83 |

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Soil Series: Hooradhahalli (HDH), **Pedon:** RM-69

Location: 13°24'31"N, 76°33'41"E, (4D3D8G2d), Hesarahalli village, Chikkanayakanahalli taluk, Tumukura district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey-skeletal, mixed isohyperthermic Rhodic Paleustalfs

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-18 | Ap | 72.56 | 15.17 | 12.27 | 4.57 | 8.33 | 17.38 | 23.88 | 18.39 | 35 | sl | - | - |
| 18-33 | Bt1 | 56.29 | 10.75 | 32.96 | 7.88 | 10.24 | 13.41 | 14.43 | 10.34 | 55 | scl | - | - |
| 33-58 | Bt2 | 46.66 | 10.79 | 42.55 | 10.79 | 9.87 | 8.43 | 9.04 | 8.53 | 55 | sc | - | - |
| 58-90 | Bt3 | 43.09 | 13.63 | 43.27 | 9.90 | 8.25 | 7.32 | 8.76 | 8.87 | 45 | c | - | - |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) dS m ⁻¹ | O.C. % | CaCO ₃ % | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation % | ESP % |
|------------|------------|-------------------|-------|------------------------------------|-----------|------------------------|--------------------|------|------|------|-------|-------|----------|----------------------|----------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | | | | | | | | | | | | |
| 0-18 | 6.54 | - | - | 0.07 | 0.60 | 0.00 | 2.68 | 1.38 | 0.44 | 0.42 | 4.91 | 5.84 | 0.48 | 84.07 | 7.11 |
| 18-33 | 5.90 | - | - | 0.07 | 0.52 | 0.00 | 3.99 | 1.27 | 0.09 | 0.37 | 5.71 | 8.61 | 0.26 | 66.32 | 4.29 |
| 33-58 | 6.16 | - | - | 0.07 | 0.44 | 0.00 | 4.92 | 1.67 | 0.08 | 0.55 | 7.22 | 10.00 | 0.24 | 72.23 | 5.50 |
| 58-90 | 6.39 | - | - | 0.06 | 0.40 | 0.00 | 4.30 | 2.02 | 0.08 | 0.46 | 6.87 | 9.21 | 0.21 | 74.61 | 5.05 |

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Series: Bidanagere (BDG), **Pedon:** RM-3

Location: 13°22'11"N, 76°38'03"E, (4D3D8G1a), Tharabenahalli village, Chikkanayakanahalli taluk, Tumakuru district.

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey-skeletal, mixed, isohyperthermic Rhodic, Paleustalfs

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-20 | Ap | 81.19 | 11.25 | 7.56 | 12.54 | 15.07 | 17.90 | 21.94 | 13.75 | 50 | ls | - | - |
| 20-35 | Bt1 | 57.45 | 11.45 | 31.10 | 12.76 | 11.02 | 10.92 | 12.45 | 10.31 | 50 | scl | - | - |
| 35-92 | Bt2 | 44.63 | 7.85 | 47.52 | 12.40 | 9.61 | 8.37 | 7.75 | 6.51 | 60 | c | - | - |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) dS m ⁻¹ | O.C. % | CaCO ₃ % | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation % | ESP % |
|------------|------------|-------------------|-------|---------------------------------|--------|---------------------|--------------------|------|------|------|-------|------|----------|-------------------|-------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | | | | | | | | | | | | |
| 0-20 | 6.24 | - | - | 0.06 | 0.60 | 0.00 | 1.61 | 0.26 | 0.10 | 0.01 | 1.98 | 3.76 | 0.50 | 52.56 | 0.35 |
| 20-35 | 5.99 | - | - | 0.02 | 0.40 | 0.00 | 4.25 | 0.46 | 0.08 | 0.28 | 5.07 | 8.02 | 0.26 | 63.18 | 3.46 |
| 35-92 | 6.70 | - | - | 0.03 | 0.20 | 0.00 | 5.45 | 0.31 | 0.10 | 0.22 | 6.09 | 9.90 | 0.21 | 61.48 | 2.24 |

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Series Name: Kumchahalli (KMH), Pedon: RM-9

Location: 15°20'05"N, 76°13'21"E, Basapura village, Koppal Taluk and District

Analysis at: NBSS&LUP, Regional Centre, Bangalore. Classification: Fine mixed, isohyperthermic Typic Rhodustalfs

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-13 | Ap | 51.76 | 9.05 | 39.19 | 7.99 | 8.84 | 13.42 | 14.38 | 7.14 | - | sc | 20.08 | 13.69 |
| 13-27 | A21 | 53.50 | 8.12 | 38.38 | 7.00 | 11.05 | 15.21 | 14.33 | 5.91 | - | sc | 17.05 | 12.32 |
| 27-43 | A22 | 63.60 | 5.01 | 31.40 | 3.85 | 11.56 | 24.52 | 18.52 | 5.14 | - | scl | 11.76 | 9.09 |
| 43-64 | Bt1 | 48.74 | 5.91 | 45.35 | 8.87 | 9.31 | 12.49 | 12.27 | 5.81 | 10 | sc | 16.68 | 13.35 |
| 64-84 | Bt2 | 45.13 | 8.90 | 45.97 | 9.86 | 7.12 | 10.95 | 10.62 | 6.57 | 20 | sc | 17.45 | 13.42 |
| 84-114 | BC | 65.04 | 6.94 | 28.02 | 10.49 | 16.21 | 17.80 | 13.88 | 6.67 | 40 | scl | 13.20 | 9.75 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) | O.C. | CaCO ₃ | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation | ESP |
|------------|------------|-------------------|-------|--------------------|------|-------------------|-----------------------|------|------|------|-------|-------|----------|-----------------|------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | dS m ⁻¹ | % | % | cmol kg ⁻¹ | | | | | % | % | | |
| 0-13 | 7.2 | - | - | 0.193 | 0.81 | 3.00 | 9.69 | 3.93 | 1.41 | 0.08 | 15.10 | 15.07 | 0.38 | 100 | 0.54 |
| 13-27 | 7.13 | - | - | 0.161 | 0.7 | 3.00 | 8.69 | 3.57 | 1.29 | 0.16 | 13.70 | 13.75 | 0.36 | 100 | 1.14 |
| 27-43 | 7.31 | - | - | 0.096 | 0.89 | 2.64 | 5.19 | 2.36 | 1.07 | 0.24 | 8.86 | 9.46 | 0.30 | 94 | 2.51 |
| 43-64 | 7.65 | - | - | 0.089 | 1.16 | 2.52 | 8.25 | 2.88 | 0.72 | 0.35 | 12.20 | 12.65 | 0.28 | 96 | 2.79 |
| 64-84 | 7.98 | - | - | 0.1 | 0.38 | 3.12 | 10.49 | 2.88 | 0.26 | 0.41 | 14.04 | 14.63 | 0.32 | 96 | 2.78 |
| 84-114 | 8.23 | - | - | 0.121 | 0.58 | 2.88 | 8.02 | 1.87 | 0.09 | 0.43 | 10.41 | 10.67 | 0.38 | 98 | 4.02 |

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Soil Series: Balapur (BPR), **Pedon:** RM-78

Location: 13°26'39"N, 76°35'03"E, (4D3D8G2c), Kasaba, Chikkanayakanahalli taluk, Tumakuru district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey-skeletal, mixed, isohyperthermic, Typic Rhodustalfs

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-12 | Ap | 65.66 | 18.66 | 15.68 | 4.14 | 6.16 | 13.33 | 21.82 | 20.20 | - | sl | - | - |
| 12-34 | Bt1 | 61.91 | 11.52 | 26.57 | 2.36 | 6.78 | 12.53 | 21.36 | 18.89 | - | scl | - | - |
| 34-60 | Bt2 | 51.81 | 11.24 | 36.94 | 4.66 | 5.70 | 12.23 | 15.96 | 13.26 | 30 | sc | - | - |
| 60-84 | Bt3 | 46.61 | 9.02 | 44.37 | 14.70 | 6.88 | 7.51 | 8.97 | 8.55 | 55 | sc | - | - |
| 84-112 | Bt4 | 48.75 | 12.92 | 38.33 | 15.73 | 8.13 | 6.87 | 8.23 | 9.79 | 60 | sc | - | - |
| 112-127 | Bc | 50.98 | 24.74 | 24.28 | 5.25 | 4.63 | 5.15 | 10.92 | 25.03 | 50 | scl | - | - |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) dS m ⁻¹ | O.C. % | CaCO ₃ % | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation % | ESP % |
|------------|------------|-------------------|-------|------------------------------------|-----------|------------------------|--------------------|------|------|------|-------|-------|----------|----------------------|----------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | | | | | | | | | | | | |
| 0-12 | 6.64 | - | - | 0.03 | 0.56 | 0.00 | 1.90 | 1.32 | 0.21 | 0.03 | 3.46 | 5.45 | 0.35 | 63.48 | 0.51 |
| 12-34 | 6.99 | - | - | 0.02 | 0.48 | 0.00 | 3.66 | 1.90 | 0.07 | 0.08 | 5.70 | 7.82 | 0.29 | 72.93 | 0.96 |
| 34-60 | 7.29 | - | - | 0.02 | 0.40 | 0.00 | 5.13 | 2.08 | 0.11 | 0.20 | 7.52 | 11.19 | 0.30 | 67.18 | 1.75 |
| 60-84 | 7.50 | - | - | 0.02 | 0.32 | 0.00 | 5.83 | 6.36 | 0.13 | 0.23 | 12.55 | 12.38 | 0.28 | 101.43 | 1.83 |
| 84-112 | 7.54 | - | - | 0.02 | 0.24 | 0.00 | 6.02 | 6.59 | 0.11 | 0.25 | 12.96 | 12.77 | 0.33 | 101.49 | 1.97 |
| 112-127 | 7.90 | - | - | 0.02 | 0.20 | 0.00 | 8.04 | 3.62 | 0.07 | 0.32 | 12.04 | 12.47 | 0.51 | 96.56 | 2.55 |

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Series Name: Nidivalalu (NDL)

Pedon: R-20

Location: 15°12'78.8"N, 75°57'44.0" E Raghunathanahalli village, Koppal Taluk and District

Analysis at: NBSS&LUP, Regional Centre, Bangalore.

Classification: Clayey –skeletal, mixed isohyperthermic Rhodic Paleustalfs

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-16 | Ap | 79.83 | 7.02 | 13.15 | 9.36 | 11.02 | 19.54 | 28.59 | 11.33 | 35-40 | sl | 14.30 | 5.17 |
| 16-31 | Bt1 | 54.75 | 10.89 | 34.36 | 12.81 | 7.47 | 12.17 | 11.95 | 10.35 | 55-60 | scl | 24.67 | 14.17 |
| 31-44 | Bt2 | 44.64 | 2.31 | 53.06 | 17.06 | 8.48 | 7.19 | 8.05 | 3.86 | 65-70 | c | 30.02 | 17.19 |
| 44-79 | Bt3 | 47.28 | 2.50 | 50.21 | 24.17 | 8.20 | 6.07 | 5.96 | 2.88 | 65-70 | sc | 27.19 | 14.87 |
| 79-107 | Bt4 | 47.79 | 8.17 | 44.04 | 13.38 | 5.72 | 11.11 | 11.87 | 5.72 | 60-65 | sc | 25.96 | 14.23 |
| 107-140 | Bt5 | 46.16 | 3.57 | 50.27 | 21.75 | 7.57 | 6.40 | 6.72 | 3.73 | 60-65 | sc | 27.28 | 15.13 |
| 140-180 | Bt6 | 49.47 | 3.94 | 46.59 | 22.49 | 8.21 | 6.29 | 7.78 | 4.69 | 65-70 | sc | 27.56 | 14.76 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) | O.C. | CaCO ₃ | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation | ESP | | | |
|------------|------------|-------------------|-------|--------------|------|-------------------|--------------------|------|------|-----------------------|-------|-------|----------|-----------------|------|---|----|-------|
| | Water | CaCl ₂ | M KCl | | | | dS m ⁻¹ | % | % | Ca | Mg | | | | | K | Na | Total |
| | | | | | | | | | | cmol kg ⁻¹ | | | | | | % | % | |
| 0-16 | 7.46 | - | - | 0.08 | 0.76 | | 6.26 | 4.05 | 0.12 | 0.09 | 10.52 | 11.45 | 0.87 | 91.88 | 0.32 | | | |
| 16-31 | 7.84 | - | - | 0.28 | 1.05 | 2.86 | - | - | 0.18 | 1.41 | - | 27.36 | 0.80 | 100.00 | 2.06 | | | |
| 31-44 | 7.69 | - | - | 0.46 | 0.81 | 2.99 | - | - | 0.24 | 2.63 | - | 32.59 | 0.61 | 100.00 | 3.23 | | | |
| 44-79 | 7.92 | - | - | 0.11 | 0.35 | 1.69 | 16.29 | 3.51 | 0.14 | 2.63 | 22.57 | 22.56 | 0.45 | 100.03 | 4.66 | | | |
| 79-107 | 7.86 | - | - | 0.09 | 0.23 | 1.43 | 12.98 | 2.83 | 0.10 | 1.82 | 17.73 | 17.88 | 0.41 | 99.19 | 4.07 | | | |
| 107-140 | 8.20 | - | - | 0.07 | 0.23 | 1.17 | 16.26 | 3.41 | 0.13 | 1.85 | 21.65 | 20.82 | 0.41 | 104.01 | 3.56 | | | |
| 140-180 | 8.11 | - | - | 0.20 | 0.15 | 1.82 | - | - | 0.11 | 1.29 | - | 20.71 | 0.44 | 100.00 | 2.49 | | | |

Contd...

Soil Series: Ranatur (RTR), **Pedon:** RM-87

Location: 13°21'49.0"N, 76°38'06"E, (4B3D4L2a), J C Pura village, Chikkanayakanahalli taluk, Tumakuru district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine, mixed, isohyperthermic Rhodic Paleustalfs

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-17 | Ap | 84.16 | 9.46 | 6.38 | 2.22 | 18.57 | 26.14 | 24.32 | 12.92 | - | ls | - | - |
| 17-47 | Bt1 | 51.14 | 8.30 | 40.56 | 1.66 | 13.49 | 14.52 | 13.59 | 7.88 | - | sc | - | - |
| 47-89 | Bt2 | 51.99 | 11.01 | 37.00 | 1.94 | 13.99 | 15.32 | 13.18 | 7.56 | - | sc | - | - |
| 89-123 | Bt3 | 51.58 | 9.07 | 39.35 | 3.47 | 14.50 | 14.61 | 11.64 | 7.35 | - | sc | - | - |
| 123-152 | Bt4 | 47.89 | 8.88 | 43.23 | 2.27 | 12.36 | 14.21 | 11.12 | 7.93 | - | sc | - | - |
| 152-198 | Bt5 | 43.37 | 13.17 | 43.45 | 2.48 | 9.83 | 13.25 | 10.87 | 6.94 | - | c | - | - |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) | O.C. | CaCO ₃ | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation | ESP |
|------------|------------|-------------------|-------|--------------|------|-------------------|--------------------|------|------|------|-------|------|----------|-----------------|------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | | | | | | | | | | | | |
| 0-17 | 5.08 | - | - | 0.03 | 0.52 | 0.00 | 3.68 | 0.72 | 0.06 | 0.19 | 4.65 | 9.21 | 1.44 | 50.50 | 2.06 |
| 17-47 | 6.28 | - | - | 0.03 | 0.48 | 0.00 | 3.93 | 0.72 | 0.08 | 0.07 | 4.80 | 7.92 | 0.20 | 60.59 | 0.94 |
| 47-89 | 6.42 | - | - | 0.03 | 0.40 | 0.00 | 4.40 | 0.74 | 0.08 | 0.06 | 5.28 | 7.52 | 0.20 | 70.15 | 0.79 |
| 89-123 | 6.50 | - | - | 0.02 | 0.32 | 0.00 | 4.44 | 0.76 | 0.09 | 0.07 | 5.36 | 7.82 | 0.20 | 68.58 | 0.93 |
| 123-152 | 6.52 | - | - | 0.02 | 0.28 | 0.00 | 4.40 | 0.71 | 0.09 | 0.07 | 5.26 | 8.22 | 0.19 | 64.00 | 0.81 |
| 152-198 | 7.09 | - | - | 0.02 | 0.24 | 0.00 | 6.10 | 0.98 | 0.10 | 0.20 | 7.38 | 9.60 | 0.22 | 76.89 | 2.09 |

Contd...

Series Name: Muttal (MTL), **Pedon:** RM-13

Location: 15°14'30.8"N, 75°56'50.6"E, Gatareddihalla village, Koppal Taluk and District

Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Clayey, mixed, isohyperthermic (Calc) (paralithic) Haplustepts

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-20 | Ap | 39.05 | 13.74 | 47.21 | 3.05 | 5.05 | 8.21 | 14.63 | 8.11 | 15-30 | c | 29.95 | 17.94 |
| 20-34 | Bwk | 28.77 | 19.57 | 51.66 | 4.81 | 4.71 | 4.92 | 9.09 | 5.24 | 10 | c | 33.44 | 21.56 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) | O.C. | CaCO ₃ | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation | ESP |
|------------|------------|-------------------|-------|--------------------|------|-------------------|--------------------|----|------|------|-------|-------|----------|-----------------|------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | | | | | | | | | | | | |
| | | | | dS m ⁻¹ | % | % | | | | | | | | % | % |
| 0-20 | 8.27 | - | - | 0.202 | 0.79 | 6.10 | - | - | 0.62 | 0.25 | - | 36.64 | 0.78 | - | 0.69 |
| 20-34 | 8.36 | - | - | 0.177 | 0.99 | 23.04 | - | - | 0.29 | 0.38 | - | 39.60 | 0.77 | - | 0.96 |

Contd...

Series Name: Dombarahalli (DRL)

Pedon: R-8

Location: 15°13'96.2"N, 75°57'48.6" E Rangunathanahalli village, Koppal taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bangalore.

Classification: Very fine, smectitic, isohyperthermic (calc) Typic Haplusterts

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-15 | Ap | 28.25 | 19.48 | 52.27 | 4.76 | 4.44 | 4.87 | 8.23 | 5.95 | - | c | 39.86 | 27.20 |
| 15-27 | BA1 | 21.55 | 20.00 | 58.45 | 3.76 | 2.76 | 3.43 | 6.30 | 5.30 | - | c | 46.35 | 34.84 |
| 27-45 | Bss1 | 14.86 | 20.89 | 64.25 | 2.46 | 2.23 | 2.23 | 3.91 | 4.02 | - | c | 57.99 | 41.06 |
| 45-80 | Bss2 | 10.42 | 19.04 | 70.54 | 1.74 | 1.97 | 1.27 | 2.78 | 2.66 | - | c | 66.36 | 36.24 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) dS m ⁻¹ | O.C. % | CaCO ₃ % | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation % | ESP % |
|------------|------------|-------------------|-------|---------------------------------|--------|---------------------|--------------------|----|------|-------|-------|-------|----------|-------------------|-------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | | | | | | | | | | | | |
| 0-15 | 8.78 | - | - | 0.42 | 0.32 | 12.35 | - | - | 0.59 | 4.25 | - | 49.70 | 0.95 | 100.00 | 5.62 |
| 15-27 | 9.03 | - | - | 0.61 | 0.30 | 12.48 | - | - | 0.30 | 8.96 | - | 57.23 | 0.98 | 100.00 | 10.07 |
| 27-45 | 9.10 | - | - | 0.67 | 0.34 | 11.70 | - | - | 0.25 | 11.85 | - | 60.71 | 0.95 | 100.00 | 14.05 |
| 45-80 | 9.18 | - | - | 0.86 | 0.32 | 13.39 | - | - | 0.27 | 15.40 | - | 63.33 | 0.90 | 100.00 | 18.45 |

Contd...

Series Name: Narsapura (NSP), **Pedon:** A2/RM-2

Location: 15°19'86.9"N, 75°57'86.1"E, Kavalura village, Koppal Taluk and District

Analysis at: NBSS&LUP, Regional Centre, Bangalore.

Classification: Very fine, smectitic, isohyperthermic (Calc) Vertic Haplustepts

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-29 | Ap | 31.32 | 16.52 | 52.16 | 5.51 | 5.40 | 5.51 | 9.83 | 5.08 | 10 | c | 38.86 | 27.64 |
| 29-52 | Bw1 | 13.30 | 22.08 | 64.62 | 2.52 | 2.41 | 2.41 | 3.67 | 2.29 | 05 | c | 49.88 | 40.05 |
| 52-77 | BW2 | 13.22 | 17.39 | 69.40 | 3.56 | 2.41 | 1.95 | 2.76 | 2.53 | 05 | c | 51.33 | 41.55 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) dS m ⁻¹ | O.C. % | CaCO ₃ % | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation % | ESP % |
|------------|------------|-------------------|-------|------------------------------------|-----------|------------------------|--------------------|----|------|-------|-------|-------|----------|----------------------|----------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | | | | | | | | | | | | |
| 0-29 | 9.16 | - | - | 0.615 | 0.23 | 9.36 | - | - | 0.72 | 10.98 | - | 51.09 | 0.98 | - | 8.60 |
| 29-52 | 8.69 | - | - | 2.01 | 0.5 | 8.64 | - | - | 0.55 | 24.42 | - | 60.63 | 0.94 | - | 16.11 |
| 52-77 | 8.52 | - | - | 2.68 | 0.46 | 7.68 | - | - | 0.50 | 25.65 | - | 60.74 | 0.88 | - | 16.90 |

Contd...

Series Name: Gatareddihal (GRH) Pedon: R-7

Location: 15°14'20.8"N, 76°04'28.4" E Gudlanur village, Koppal Taluk and District

Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Very fine, smectitic, isohyperthermic sodic Haplusterts

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-18 | Ap | 20.07 | 19.71 | 60.23 | 1.76 | 3.75 | 3.64 | 3.42 | 7.50 | - | c | 41.70 | 29.56 |
| 18-51 | Bss1 | 15.11 | 17.47 | 67.42 | 3.16 | 3.04 | 2.25 | 3.38 | 3.27 | - | c | 59.43 | 38.52 |
| 51-80 | Bss2 | 13.19 | 18.74 | 68.07 | 1.80 | 2.93 | 2.37 | 3.04 | 3.04 | - | c | 60.69 | 40.91 |
| 80-107 | Bss3 | 17.54 | 19.50 | 62.96 | 2.46 | 4.13 | 3.24 | 4.25 | 3.46 | - | c | 57.25 | 37.31 |
| 107-131 | BC | 9.42 | 17.48 | 73.10 | 1.48 | 1.82 | 1.36 | 1.93 | 2.84 | - | c | 64.62 | 43.98 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) | O.C. | CaCO ₃ | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation | ESP |
|------------|------------|-------------------|-------|--------------------|------|-------------------|-----------------------|----|------|-------|-------|-------|----------|-----------------|-------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | dS m ⁻¹ | % | % | cmol kg ⁻¹ | | | | | % | % | | |
| 0-18 | 9.08 | - | - | 0.23 | 0.33 | 6.89 | - | - | 0.70 | 6.36 | - | 63.21 | 1.05 | 100.00 | 7.11 |
| 18-51 | 9.19 | - | - | 0.61 | 0.49 | 9.10 | - | - | 0.54 | 14.20 | - | 66.05 | 0.98 | 100.00 | 15.98 |
| 51-80 | 9.27 | - | - | 0.56 | 0.29 | 9.36 | - | - | 0.49 | 14.75 | - | 65.63 | 0.96 | 100.00 | 17.07 |
| 80-107 | 9.28 | - | - | 0.57 | 0.39 | 9.62 | - | - | 0.44 | 14.64 | - | 63.95 | 1.02 | 100.00 | 17.49 |
| 107-131 | 9.04 | - | - | 1.08 | 0.31 | 8.32 | - | - | 0.52 | 16.40 | - | 68.36 | 0.94 | 100.00 | 17.30 |

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Series Name: Kadagathur (KDT)

Pedon : R-7

Location: 15°26'48"N, 76°09'51" E Budashettynala village, Koppal Taluk and District

Analysis at: NBSS&LUP, Regional Centre, Bangalore.

Classification: Fine, mixed, isohyperthermic Fluventic Haplustepts

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-12 | Ap | 75.90 | 8.77 | 15.33 | 17.33 | 18.36 | 14.36 | 15.90 | 9.95 | - | sl | 10.66 | 5.33 |
| 12-37 | A2 | 62.54 | 11.35 | 26.11 | 8.46 | 20.54 | 13.31 | 12.07 | 8.15 | - | scl | 15.61 | 8.22 |
| 37-71 | Bw1 | 52.73 | 10.51 | 36.77 | 6.08 | 18.24 | 12.47 | 9.01 | 6.92 | - | sc | 19.66 | 11.21 |
| 71-93 | Bw2 | 33.26 | 22.65 | 44.09 | 3.13 | 12.53 | 7.78 | 5.18 | 4.64 | - | c | 30.08 | 17.34 |
| 93-118 | Bw3 | 31.01 | 24.57 | 44.42 | 2.04 | 10.41 | 8.26 | 6.01 | 4.29 | - | c | 34.92 | 18.16 |
| 118-170 | Bw4 | 38.31 | 18.73 | 42.96 | 2.99 | 14.62 | 10.35 | 6.30 | 4.06 | - | c | 46.06 | 19.59 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) dS m ⁻¹ | O.C. % | CaCO ₃ % | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation % | ESP % |
|------------|------------|-------------------|-------|---------------------------------|--------|---------------------|--------------------|-------|------|-------|-------|-------|----------|-------------------|-------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | | | | | | | | | | | | |
| 0-12 | 6.95 | - | - | 0.17 | 1.28 | 0.39 | 9.17 | 2.76 | 0.10 | 0.08 | 12.11 | 12.10 | 0.79 | 100.09 | 0.65 |
| 12-37 | 7.55 | - | - | 0.17 | 0.40 | 0.40 | 8.36 | 4.51 | 0.08 | 0.40 | 13.35 | 13.30 | 0.51 | 100.37 | 3.02 |
| 37-71 | 7.60 | - | - | 0.21 | 0.44 | 0.39 | 10.67 | 8.19 | 0.10 | 0.74 | 19.70 | 19.10 | 0.52 | 103.12 | 3.88 |
| 71-93 | 8.26 | - | - | 0.28 | 0.72 | 1.56 | 14.97 | 12.13 | 0.12 | 3.07 | 30.29 | 29.40 | 0.67 | 103.01 | 10.45 |
| 93-118 | 8.44 | - | - | 0.58 | 0.68 | 1.17 | 13.32 | 10.77 | 0.13 | 4.76 | 28.98 | 28.50 | 0.64 | 101.68 | 12.40 |
| 118-170 | 9.06 | - | - | 0.64 | 0.44 | 1.17 | 8.92 | 8.14 | 0.23 | 12.32 | 29.61 | 28.60 | 0.67 | 103.53 | 37.27 |

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Series Name: Bardur (BDR), **Pedon:** R-4

Location: 15°14'31.7"N, 76°01'19.1"E, Moranali village, Koppal Taluk and District

Analysis at: NBSS&LUP, Regional Centre, Bangalore.

Classification: Very fine, smectitic, isohyperthermic (calcareous) Typic Haplusterts.

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|------------|---------|---------------------------------------|-------------------|---------------|-----------------------|------------------|-------------------|-----------------|----------------------|--------------------------|----------------------|------------|--------|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | | |
| 0-25 | Ap | 21.78 | 22.78 | 55.44 | 2.17 | 3.68 | 4.44 | 6.61 | 4.88 | - | c | 36.78 | 26.95 |
| 25-53 | BA | 18.62 | 18.56 | 62.82 | 2.23 | 4.24 | 3.46 | 5.24 | 3.46 | - | c | 41.25 | 29.87 |
| 53-90 | Bss1 | 15.87 | 18.60 | 65.53 | 2.23 | 1.34 | 4.25 | 3.91 | 4.13 | - | c | 44.73 | 33.64 |
| 90-126 | Bss2 | 13.66 | 20.02 | 66.32 | 1.68 | 2.80 | 2.35 | 3.70 | 3.14 | - | c | 49.24 | 38.37 |
| 126-152 | Bss3 | 11.64 | 20.79 | 67.57 | 1.69 | 1.81 | 1.81 | 3.50 | 2.82 | - | c | 53.50 | 41.90 |
| 152-210 | Bss4 | 11.38 | 22.78 | 65.42 | 2.16 | 2.16 | 1.93 | 3.07 | 2.05 | - | c | 51.53 | 39.64 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) | O.C. | CaCO ₃ | Exchangeable bases | | | | | CEC | CEC/Clay | Base saturation | ESP |
|------------|------------|-------------------|-------|--------------------|------|-------------------|--------------------|----|------|-------|-------|-------|----------|-----------------|-------|
| | Water | CaCl ₂ | M KCl | | | | Ca | Mg | K | Na | Total | | | | |
| | | | | | | | | | | | | | | | |
| | | | | dS m ⁻¹ | % | % | | | | | | | | % | % |
| 0-25 | 8.73 | - | 22.78 | 0.203 | 0.24 | 5.76 | - | - | 0.65 | 4.43 | - | 40.56 | 0.73 | - | 4.37 |
| 25-53 | 9.17 | - | 18.56 | 0.295 | 0.45 | 4.92 | - | - | 0.32 | 10.47 | - | 74.70 | 1.19 | - | 5.61 |
| 53-90 | 9.27 | - | 18.60 | 0.388 | 0.66 | 6.00 | - | - | 0.24 | 10.49 | - | 76.20 | 1.16 | - | 5.51 |
| 90-126 | 9.22 | - | 20.02 | 0.608 | 0.57 | 5.88 | - | - | 0.21 | 15.93 | - | 77.20 | 1.16 | - | 8.25 |
| 126-152 | 9.21 | - | 20.79 | 0.936 | 0.33 | 6.60 | - | - | 0.37 | 20.88 | - | 80.90 | 1.20 | - | 10.32 |
| 152-210 | 9.03 | - | 23.21 | 1.47 | 0.33 | 8.16 | - | - | 0.24 | 15.34 | - | 73.10 | 1.12 | - | 8.39 |

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INTERPRETATION FOR LAND RESOURCE MANAGEMENT

The most important soil and site characteristics that affect the land use and conservation needs of an area are land capability, land irrigability, soil depth, soil texture, coarse fragments, available water capacity, soil slope, soil erosion, soil reaction etc. These are interpreted from the data base generated through land resource inventory and several thematic maps are generated. These would help in identifying the areas suitable for growing crops and, soil and water conservation measures and structures needed thus helping to maintain good soil health for sustained crop production. The various thematic maps generated are described below.

5.1 Land Capability Classification

Land capability classification is an interpretative grouping of soil map units (soil phases) mainly based on inherent soil characteristics, external land features and environmental factors that limit the use of land for agriculture, pasture, forestry, or other uses on a sustained basis (IARI, 1971). The land and soil characteristics used to group the land resources in an area into various land capability classes, subclasses and units are

Soil characteristics: Soil depth, soil texture, coarse fragments, soil reaction, available water capacity, calcareousness, salinity/alkali *etc.*

Land characteristics: Slope, erosion, drainage, rock outcrops.

Climate: Total rainfall and its distribution, and length of crop growing period.

The Land Capability Classification system is divided into land capability classes, subclasses and units based on the level of information available. Eight land capability classes are recognized. They are

Class I: They are very good lands that have no limitations or very few limitations that restrict their use.

Class II: They are good lands that have minor limitations and require moderate conservation practices.

Class III: They are moderately good lands that have severe limitations that reduce the choice of crops or that require special conservation practices.

Class IV: They are fairly good lands that have very severe limitations that reduce the choice of crops or that require very careful management.

Class V: Soils in these lands are not likely to erode, but have other limitations like wetness that are impractical to remove and as such not suitable for agriculture, but suitable for pasture or forestry with minor limitations.

Class VI: The lands have severe limitations that make them generally unsuitable for cultivation, but suitable for pasture or forestry with moderate limitations.

Class VII: The lands have very severe limitations that make them unsuitable for cultivation, but suitable for pasture or forestry with major limitations.

Class VIII: Soil and other miscellaneous areas (rock lands) that have very severe limitations that nearly preclude their use for any crop production, but suitable for wildlife, recreation and installation of wind mills.

The land capability subclasses are recognized based on the dominant limitations observed within a given land capability class. The subclasses are designated by adding a lower case letter like ‘e’, ‘w’, ‘s’, or ‘c’ to the class numeral. The subclass “e” indicates that the main hazard is risk of erosion, “w” indicates drainage or wetness as a limitation for plant growth, “s” indicates shallow soil depth, coarse or heavy textures, calcareousness, salinity/alkalinity or gravelliness and “c” indicates limitation due to climate.

The land capability subclasses have been further subdivided into land capability units based on the kinds of limitations present in each subclass. Ten land capability units are used in grouping the soil map units. They are stony or rocky (0), erosion hazard (slope, erosion) (1), coarse texture (sand, loamy sand, sandy loam) (2), fine texture (cracking clay, silty clay) (3), slowly permeable subsoil (4), coarse underlying material (5), salinity/alkali (6), stagnation, overflow, high ground water table (7), soil depth (8) and fertility problems (9). The capability units thus identified have similar soil and land characteristics that respond similarly to a given level of management. The soils of the microwatershed have been classified upto land capability subclass level.

The 26 soil map units identified in the Bikkanahalli microwatershed are grouped under three land capability classes and seven land capability subclasses (Fig. 5.1).

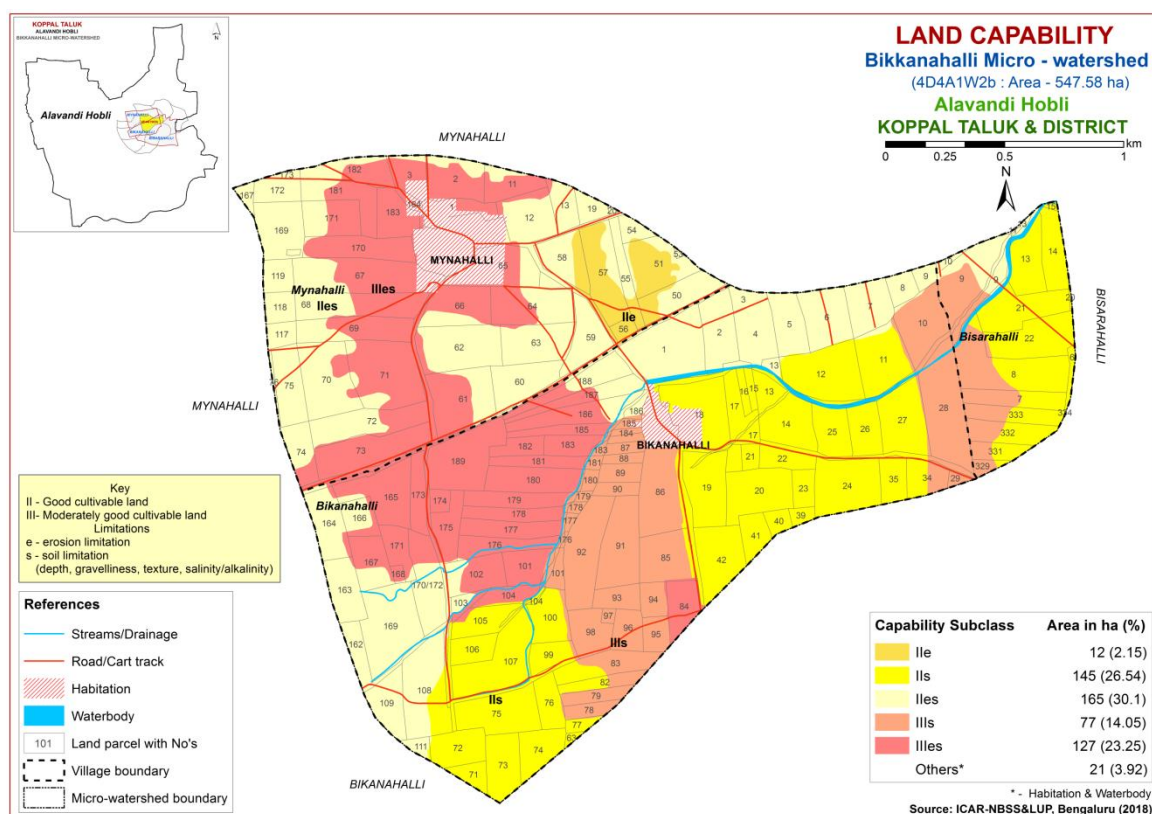


Fig. 5.1 Land Capability classification map of Bikkanahalli Microwatershed

Entire area in the microwatershed is suitable for agriculture. Good cultivable lands (Class II) cover a maximum area of about 322 ha (59%) and distributed in the major part of the microwatershed with minor problems of soil and erosion. Moderately good cultivable lands (Class III) occupy an area of about 204 ha (37%) and distributed in the northern, western, southern and eastern part of the microwatershed with severe limitations of soil and erosion. An area of about 21 ha (4%) is covered by others (habitation and water body).

5.2 Soil Depth

Soil depth refers to the depth of the soil occurring above the parent material or hard rock. The depth of the soil determines the effective rooting depth for plants and in accordance with soil texture, mineralogy and gravel content, the capacity of the soil column to hold water and nutrient availability. Soil depth is one of the most important soil characteristic that is used in differentiating soils into different soil series. The soil depth classes used in identifying soils in the field are very shallow (<25 cm), shallow (25-50 cm), moderately shallow (50-75 cm), moderately deep (75-100 cm), deep (100-150 cm) and very deep (>150 cm). They were used to classify the soils into different depth classes and a soil depth map was generated (Fig. 5.2). The area extent and their geographical distribution in the microwatershed is given in Fig. 5.2.

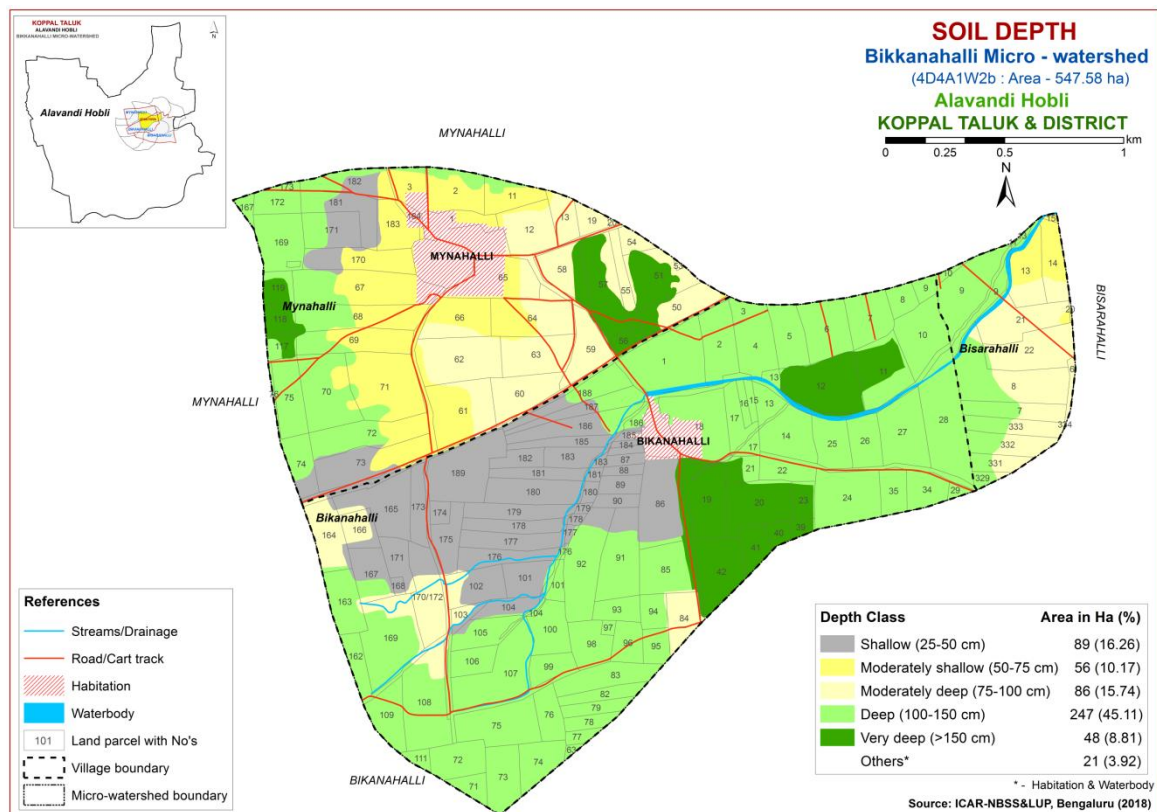


Fig. 5.2 Soil Depth map of Bikkanahalli Microwatershed

Shallow (25-50 cm) soils cover an area of about 89 ha (16%) and are distributed in the northern, western and central part of the microwatershed. Moderately shallow (50-75 cm) soils cover an area of about 56 ha (10%) and distributed in the northern part of the microwatershed. An area of about 86 ha (16%) is moderately deep soils (75-100 cm) and are distributed in the northern, southern, western and eastern part of the microwatershed. Deep to very deep (100- >150 cm) soils occupy a maximum area of about 295 ha (54%) and are distributed in the major part of the microwatershed.

The most productive lands cover about 295 ha (54%) where all climatically adopted long duration crops be grown.

5.3 Surface Soil Texture

Texture is an expression to indicate the coarseness or fineness of the soil as determined by the relative proportion of primary particles of sand, silt and clay. It has a direct bearing on the structure, porosity, adhesion and consistence. The surface layer of a soil to a depth of about 25 cm is the layer that is most used by crops and plants. The surface soil textural class provides a guide to understanding soil-water retention and availability, nutrient holding capacity, infiltration, workability, drainage, physical and chemical behavior, microbial activity and crop suitability. The textural classes used for LRI were used to classify and a surface soil texture map was generated. The area extent and their geographical distribution in the microwatershed is shown in Fig 5.3.

An area of about 71 ha (13 %) is loamy at the surface and are distributed in the northern and southern part of the microwatershed. Maximum area of about 455 ha (83%) is clay at the surface and distributed in the major part of the microwatershed.

The most productive lands with respect to surface soil texture are clayey soils that (83%) have high potential for soil-water retention and availability and nutrient retention and availability, but have more problems of drainage, infiltration, workability and other physical problems. The other productive lands are loamy (13%) soils which also have high potential for soil- water retention and nutrient availability but have no drainage or other physical problems.

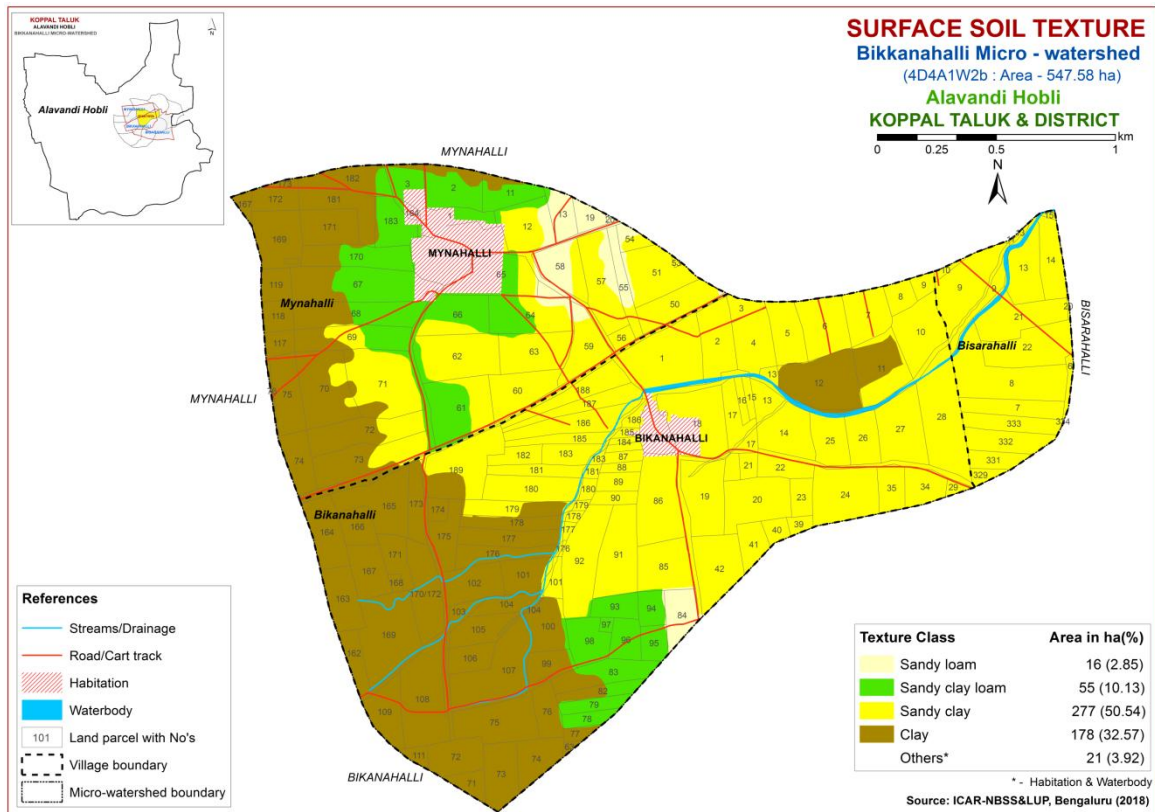


Fig. 5.3 Surface Soil Texture map of Bikkanahalli Microwatershed

5.4 Soil Graveliness

Gravel is the term used for describing coarse fragments between 2 mm and 7.5 cm diameter and stones for those between 7.5 cm and 25 cm. The presence of gravel and stones in soil reduces the volume of soil responsible for moisture and nutrient storage, drainage, infiltration and runoff, and hinders plant growth by impeding root growth and seedling emergence, intercultural operations and farm mechanization. The graveliness classes used in LRI were used to classify the soils and using these classes a graveliness map was generated. The area extent and their geographic distribution in the microwatershed is shown in Fig. 5.4.

The soils that are non-gravelly (<15% gravel) covers an area of about 202 ha (37 %) and distributed in northern, western, southern and eastern part of the microwatershed. maximum area of about 306 ha (56%) is covered by gravelly (15-35% gravel) soils and are distributed in all part of the microwatershed. Very gravelly (35-60%) soils cover an area of about 19 ha (3%) and are distributed in the southeastern part of the microwatershed (Fig. 5.4).

The most productive lands with respect to graveliness are found to be 37 per cent that are non gravelly (<15%) soils. These are most productive soils and have potential for growing both annual and perennial crops. The problem soils that are gravelly to very gravelly (15-60%) cover a maximum area of about 59 per cent where only short duration crops can be grown.

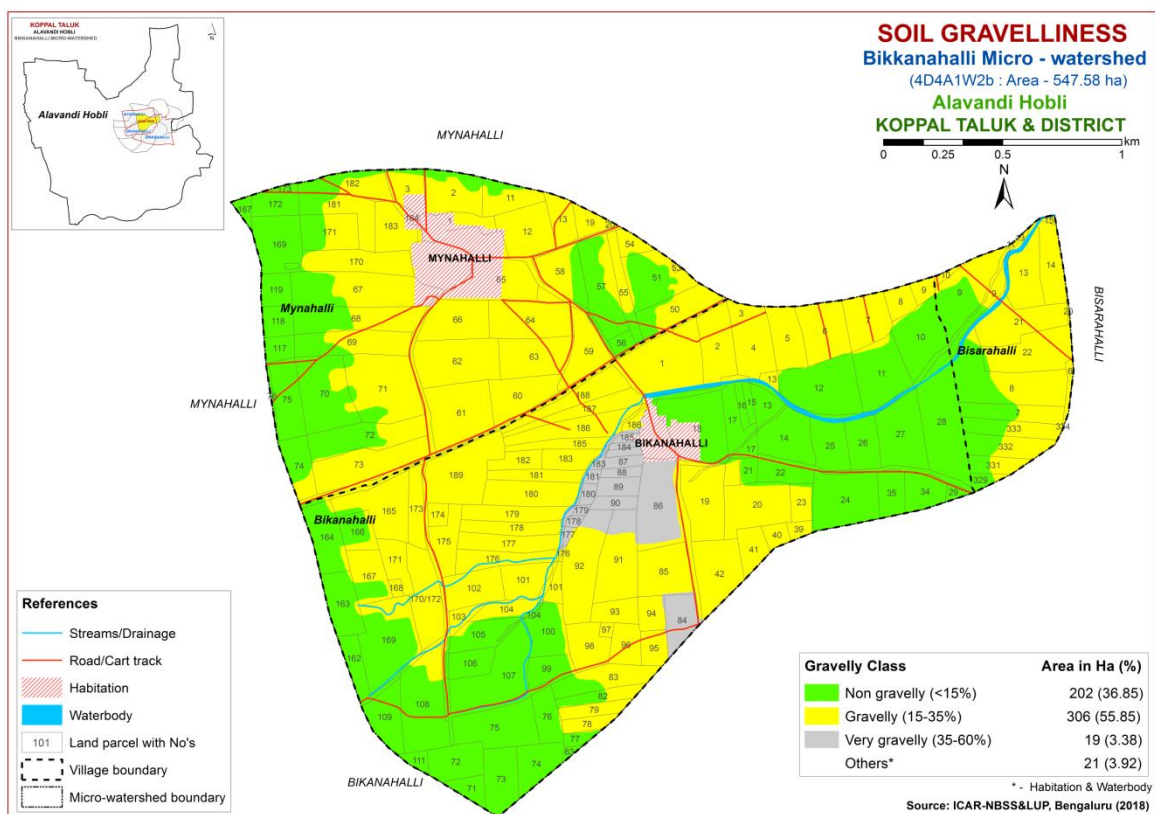


Fig. 5.4 Soil Gravelliness map of Bikkanahalli Microwatershed

5.5 Available Water Capacity

The soil available water capacity (AWC) is estimated based on the ability of the soil column to retain water between the tensions of 0.33 and 15 bar in a depth of 100 cm or the entire solum if the soil is shallower. The AWC of the soils (soil series) as estimated by considering the soil texture, mineralogy, soil depth and gravel content (Sehgal *et al.*, 1990) and accordingly the soil map units were grouped into five AWC classes *viz.*, very low (<50 mm/m), low (50-100 mm/m), medium (100-150 mm/m), high (150-200 mm/m) and very high (>200 mm/m) and using these values, an AWC map was generated. The area extent and their geographic distribution of different AWC classes in the microwatershed is shown in Fig. 5.5.

An area of about 111 ha (20%) in the microwatershed has soils that are very low (<50 mm/m) in available water capacity and are distributed in the northern, central and southeastern part of the microwatershed. Maximum area of about 190 ha (35%) has soils that are low (51 to 100 mm/m) in available water capacity and are distributed in the major part of the microwatershed. An area of about 99 ha (18%) has soils that are medium (101-150 mm/m) in available water capacity and are distributed in the western, southern and eastern part of the microwatershed. An area of about 12 ha (2%) is high (151-200mm/m) in available water capacity and are distributed in the northern part of the microwatershed. An area of about 114 ha (21%) is very high (>200 mm/min) in available water capacity and distributed in the northern, western, southern and eastern part of the microwatershed.

An area of about 301 ha (55%) in the microwatershed has soils that are problematic with regard to available water capacity. Here, only short duration crops can be grown and the probability of crop failure is very high. These areas are best put to other alternative uses. An area of about 126 ha (23%) has soils that have high potential (>200 mm/m) with regard to available water capacity where all climatically adapted long duration crops can be grown successfully.

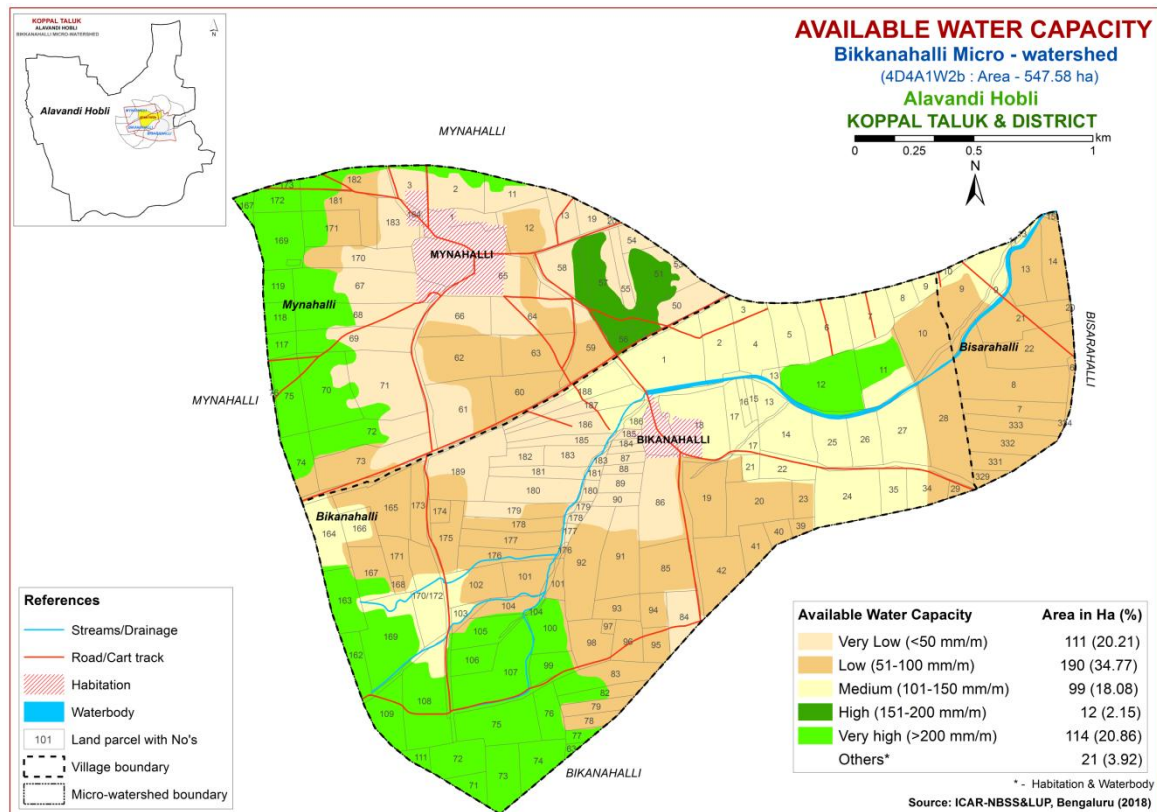


Fig. 5.5 Soil Available Water Capacity map of Bikkanahalli Microwatershed

5.6 Soil Slope

Soil slope refers to the inclination of the surface of the land. It is defined by gradient, shape and length, and is an integral feature of any soil as a natural body. Slope is considered important in soil genesis, land use and land development. The length and gradient of slope influences the rate of runoff, infiltration, erosion and deposition. The soil map units were grouped into three slope classes and a slope map was generated showing the area extent and their geographic distribution of different slope classes in the microwatershed (Fig. 5.6).

An area of about 71 ha (13%) in the microwatershed falls under nearly level (0-1%) lands and are distributed in the southern and eastern part of the microwatershed. Very gently sloping (1-3%) lands cover a maximum area of about 455 ha (83%) and are distributed in all parts of the microwatershed. In these areas, all climatically adapted annual and perennial crops can be grown without much soil and water conservation and other land development measures.

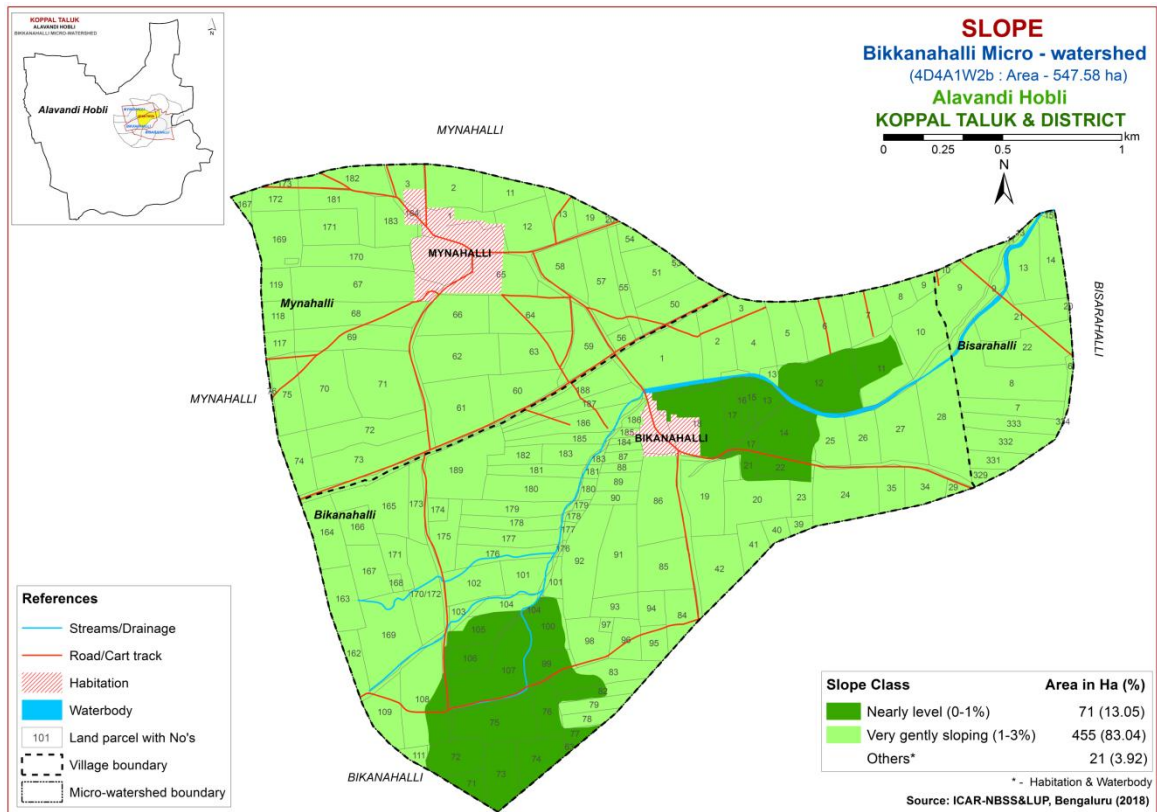


Fig. 5.6 Soil Slope map of Bikkanahalli Microwatershed

5.7 Soil Erosion

Soil erosion refers to the wearing away of the earth's surface by the forces of water, wind and ice involving detachment and transport of soil by raindrop impact. It is used for accelerated soil erosion resulting from disturbance of the natural landscape by burning, excessive grazing and indiscriminate felling of forest trees and tillage, all usually by man. The erosion classes showing an estimate of the current erosion status as judged from field observations in the form of rills, gullies or a carpet of gravel on the surface are recorded. Four erosion classes, viz, slight erosion (e1), moderate erosion (e2), severe erosion (e3) and very severe erosion (e4) are recognized. The soil map units were grouped into different erosion classes and a soil erosion map generated. The area extent and their spatial distribution in the microwatershed is given in Figure 5.7.

Slightly eroded lands cover an area of about 225 ha (41%) and are distributed in the southern and eastern part of the microwatershed. Maximum area of about 301 ha (55%) is moderately eroded (e2 class) and distributed in the major part of the microwatershed. Moderately eroded lands are problematic and need appropriate soil and water conservation and other land development measures.

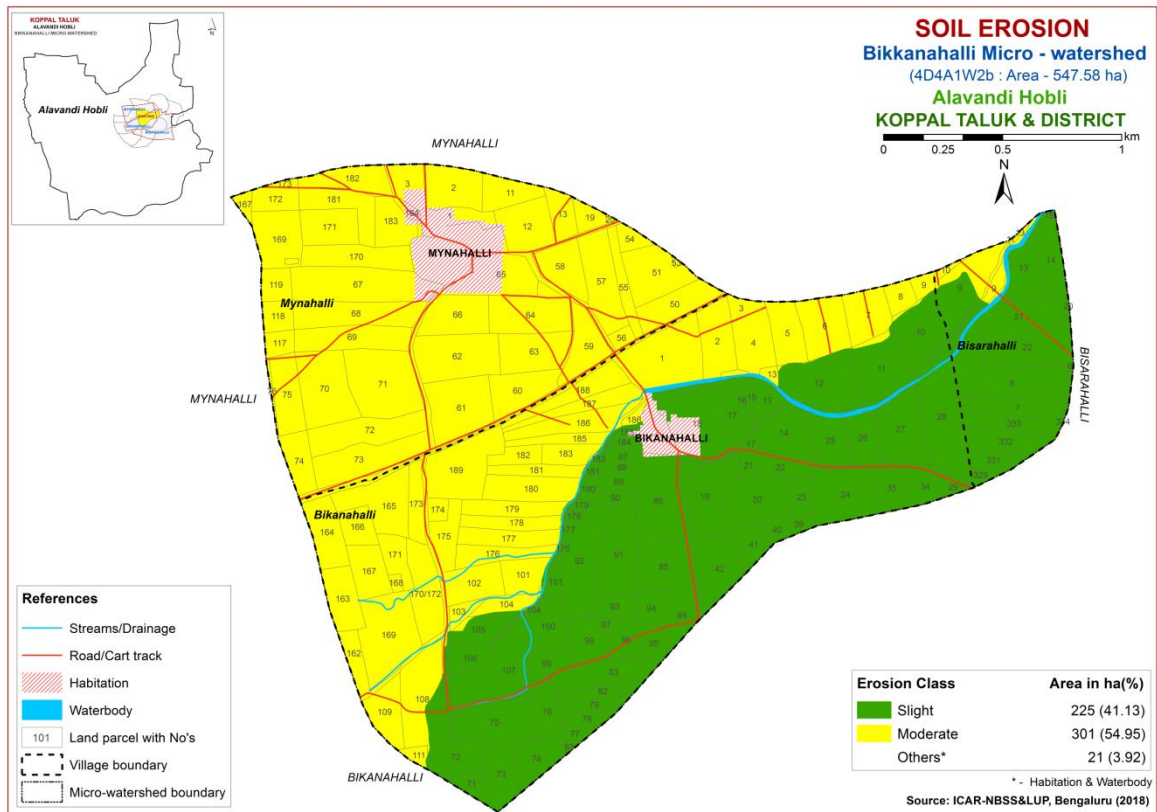


Fig. 5.7 Soil Erosion map of Bikkanahalli Microwatershed

FERTILITY STATUS

Soil fertility plays an important role in increasing crop yield. The adoption of high yielding varieties that require high amounts of nutrients has resulted in deficiency symptoms in crops and plants due to imbalanced fertilization and poor inherent fertility status, as these areas are characterized by low rainfall and high temperatures. Hence, it is necessary to know the fertility (macro and micro nutrients) status of the soils of the watersheds for assessing the kind and amount of fertilizers required for each of the crop intended to be grown. For this purpose, the surface soil samples collected from the grid points (one soil sample at every 320 m grid interval) all over the microwatershed through land resource inventory in the year 2017 were analyzed for pH, EC, organic carbon, available phosphorus and potassium, and for micronutrients like zinc, boron, copper, iron and manganese, and secondary nutrient sulphur.

Soil fertility data generated has been assessed and individual maps for all the nutrients for the microwatershed have been generated by using the Kriging method under GIS. The village/survey number wise fertility data for the microwatershed is given in Appendix-II.

6.1 Soil Reaction (pH)

The soil analysis of the Bikkanahalli microwatershed for soil reaction (pH) showed that an area of 12 ha (2%) is slightly alkaline (pH 7.3-7.8) and are distributed in the eastern part of the microwatershed. Maximum area of about 238 ha (44%) is moderately alkaline (pH 7.8-8.4) and are distributed in all part of the microwatershed. An area of about 120 ha (22%) is strongly alkaline (pH 8.4-9.0) and are distributed in the northern, central and southern part of the microwatershed. Very strongly alkaline (pH >9.0) soils covers an area of about 156 ha (28%) and distributed in the northern, western and southern part of the microwatershed. Thus, major soils in the microwatershed are alkaline in reaction (Fig.6.1).

6.2 Electrical Conductivity (EC)

The Electrical Conductivity of the entire microwatershed area is $<2 \text{ dSm}^{-1}$ (Fig 6.2) and as such the soils are non-saline.

6.3 Organic Carbon

Maximum area of about 265 ha (48%) is low ($<0.5\%$) in organic carbon content and are distributed in all part of the microwatershed. An area of about 260 ha (48%) is medium (0.5-0.75%) in organic carbon content and distributed in the northern, central, eastern and southern part of the microwatershed. An area of about 1 ha ($<1\%$) is high ($>0.75\%$) in organic carbon and distributed in the eastern part of the microwatershed (Fig.6.3).

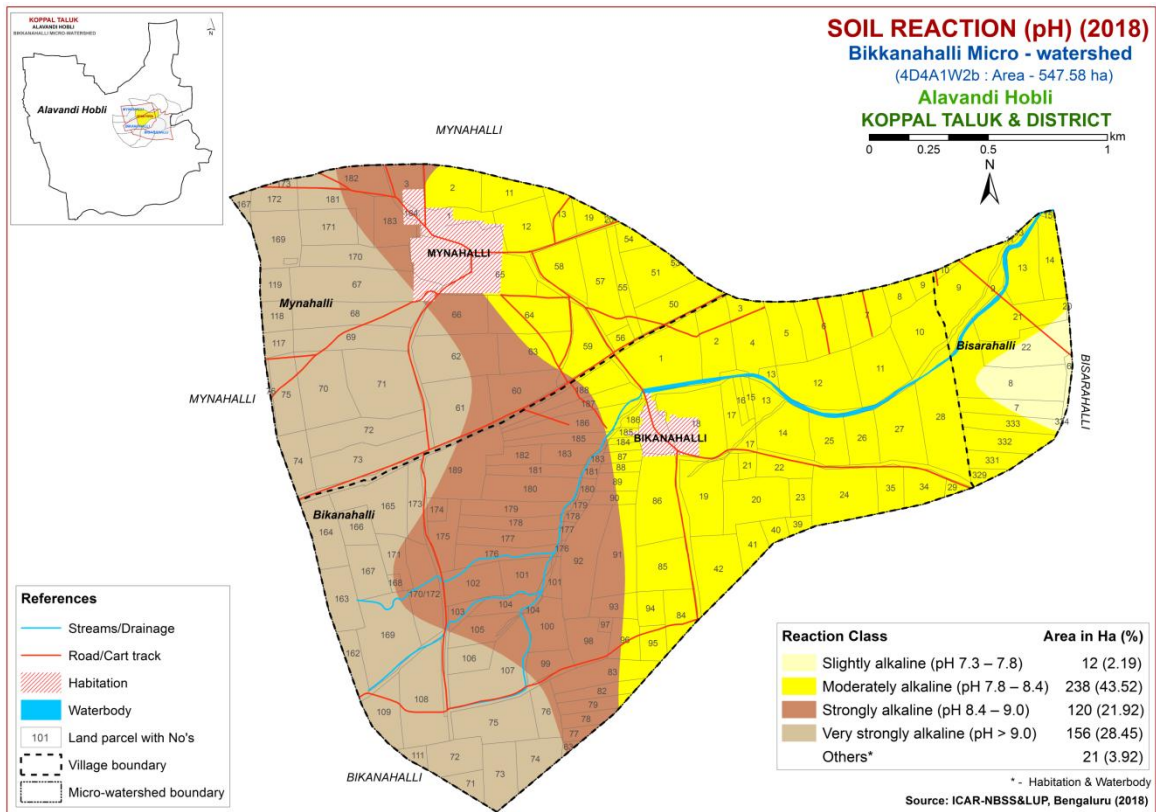


Fig.6.1 Soil Reaction (pH) map of Bikkanahalli Microwatershed

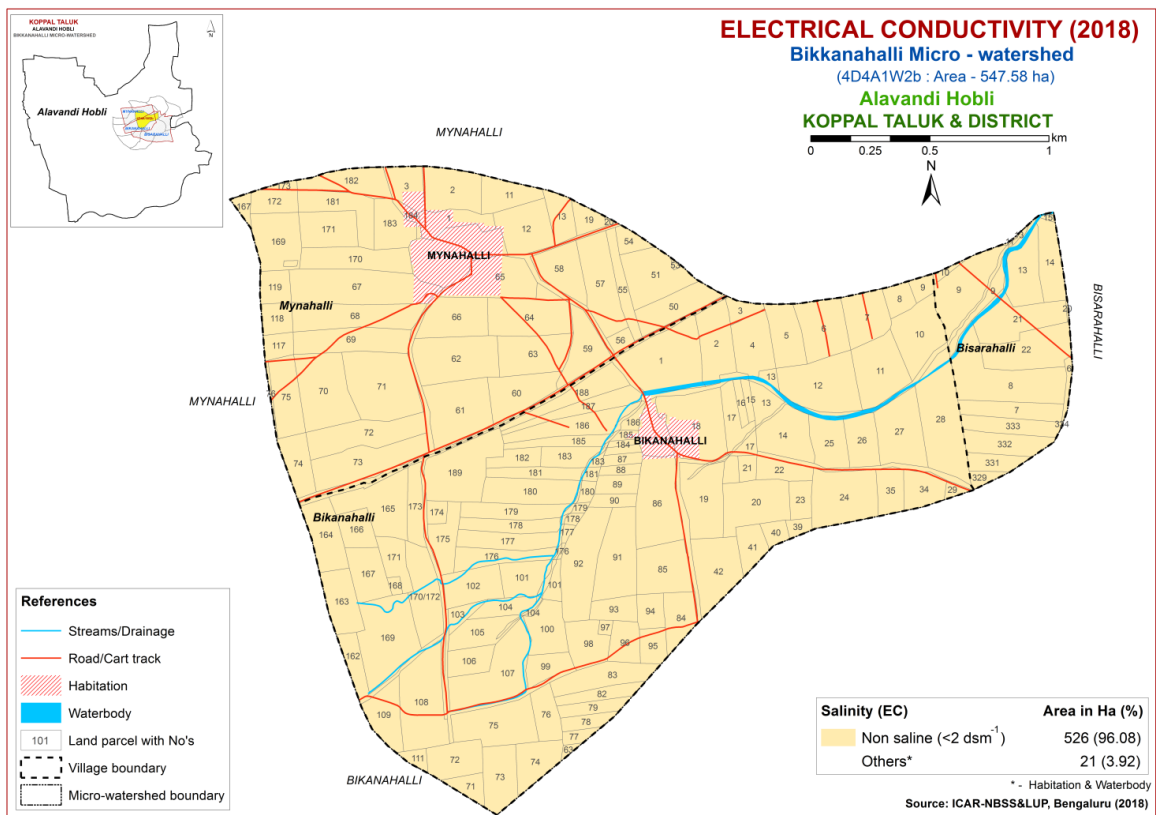


Fig.6.2 Electrical Conductivity (EC) map of Bikkanahalli Microwatershed

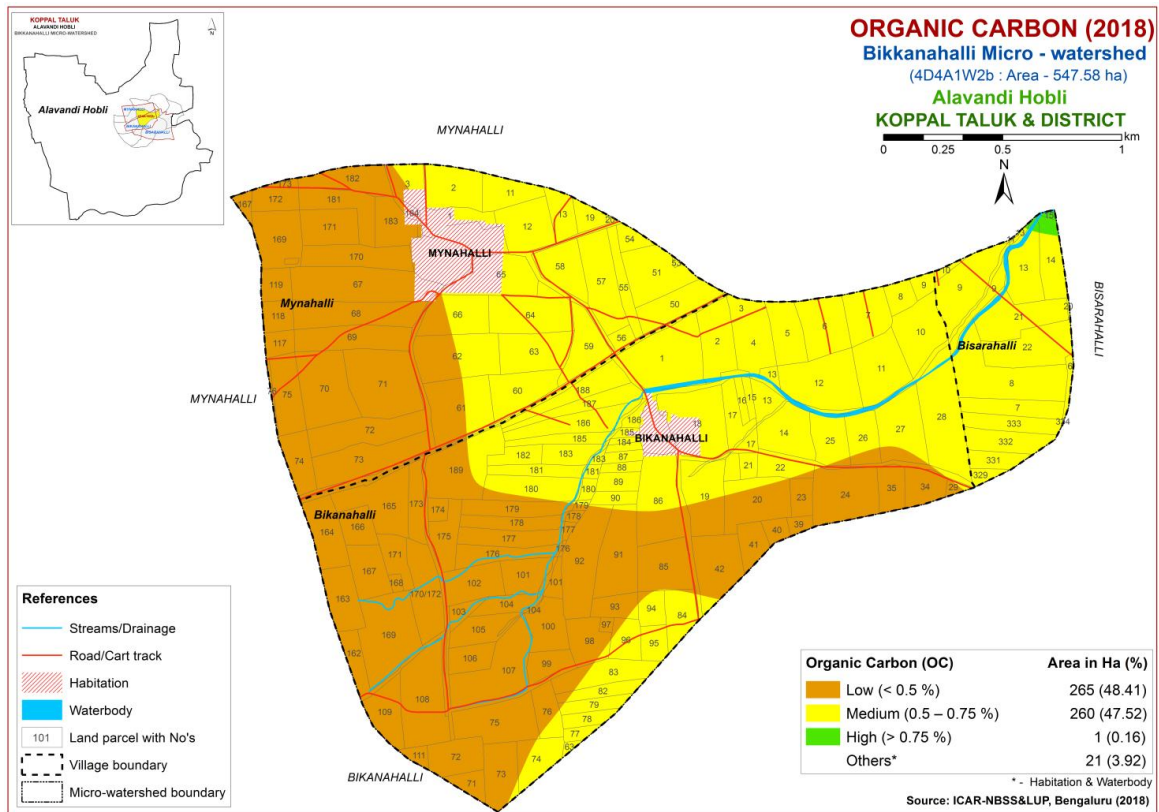


Fig.6.3 Soil Organic Carbon map of Bikkanahalli Microwatershed

6.4 Available Phosphorus

An area of about 136 ha (25%) is low in available phosphorus and distributed in the northwestern, western, southwestern and southern part of the microwatershed. maximum area of about 390 ha (71%) is medium (23-57 kg/ha) and distributed in all part of the microwatershed. Apply additional 25% phosphorous in areas where it is low and medium (Fig 6.4).

6.5 Available Potassium

Available potassium content is medium (145-337 kg/ha) in an area of about 19 ha (3%) and are distributed in the northwestern part of the microwatershed (Fig. 6.5). High (>337 kg/ha) in maximum area of 508 ha (93%) and are distributed in all part of the microwatershed. Apply additional 25% potassium in areas where it is medium.

6.6 Available Sulphur

Available sulphur content in Bikkanahalli microwatershed showed that a maximum area of about 389 ha (71%) is medium (10-20 ppm) in available sulphur content and distributed in all part of the microwatershed. An area of about 137 ha (25%) is high in available sulphur and distributed in the eastern and southern part of the microwatershed (Fig.6.6). The areas that are medium in available sulphur need to be applied with magnesium sulphate or gypsum or factomphos (p) fertilizer (13% sulphur) for 2-3 years for the deficiency to be corrected.

6.7 Available Boron

Available boron content in Bikkanahalli microwatershed is low (< 0.5ppm) in a maximum area of about 477 ha (87%) and distributed in the major part of the microwatershed. An area of about 49 ha (9%) is medium (0.5-1.0 ppm) and distributed in the northern and northwestern part of the microwatershed (Fig.6.7).

6.8 Available Iron

Available iron content is sufficient (>4.5 ppm) in the entire microwatershed area (Fig 6.8).

6.9 Available Manganese

Available manganese content is sufficient (>1.0 ppm) in the entire microwatershed area (Fig 6.9).

6.10 Available Copper

Available copper content is sufficient (>0.2 ppm) in the entire microwatershed area (Fig 6.10).

6.11 Available Zinc

Available zinc content is deficient (<0.6 ppm) in the entire microwatershed area (Fig 6.11).

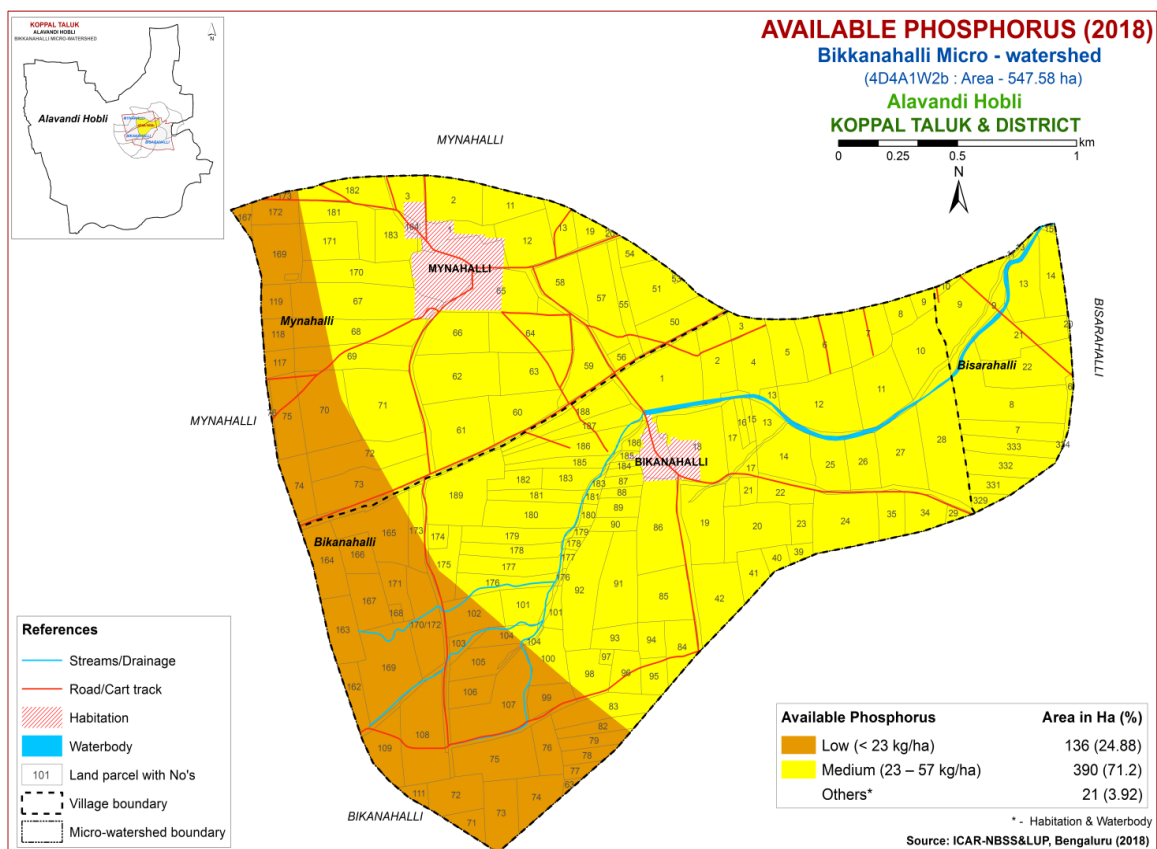


Fig.6.4 Soil Available Phosphorus map of Bikkanahalli Microwatershed

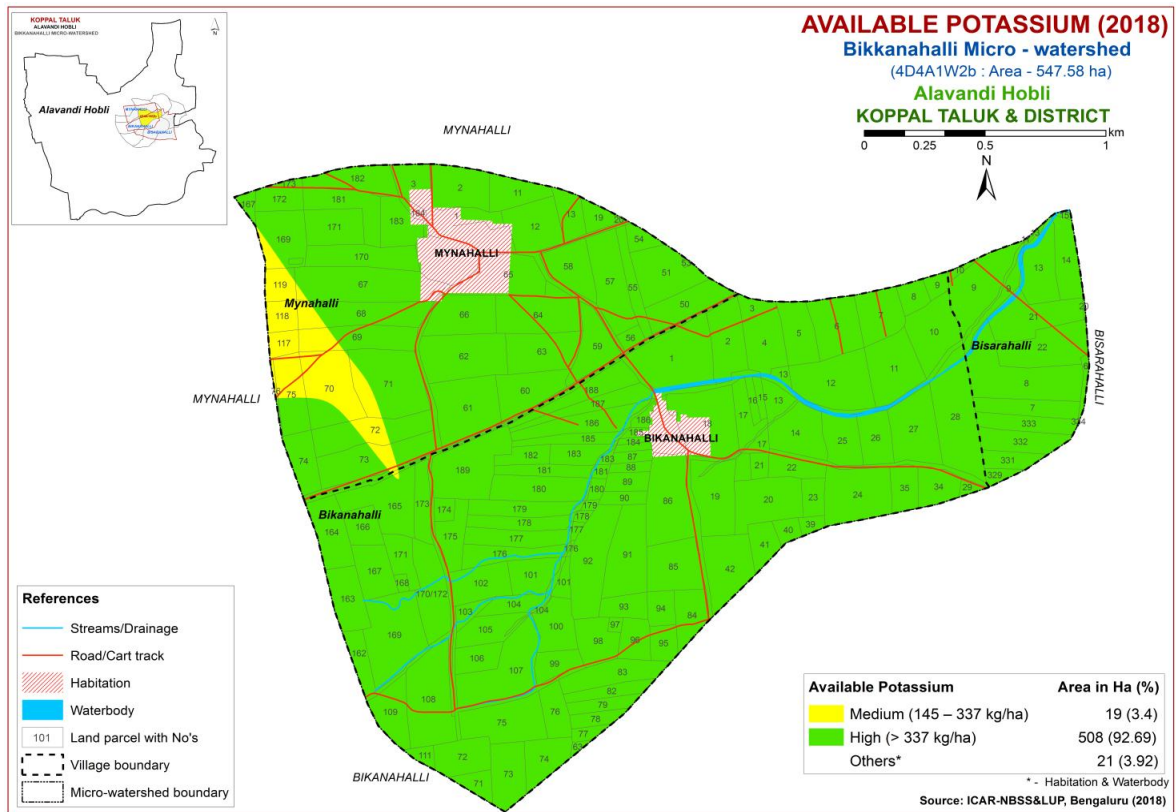


Fig.6.5 Soil Available Potassium map of Bikkanahalli Microwatershed

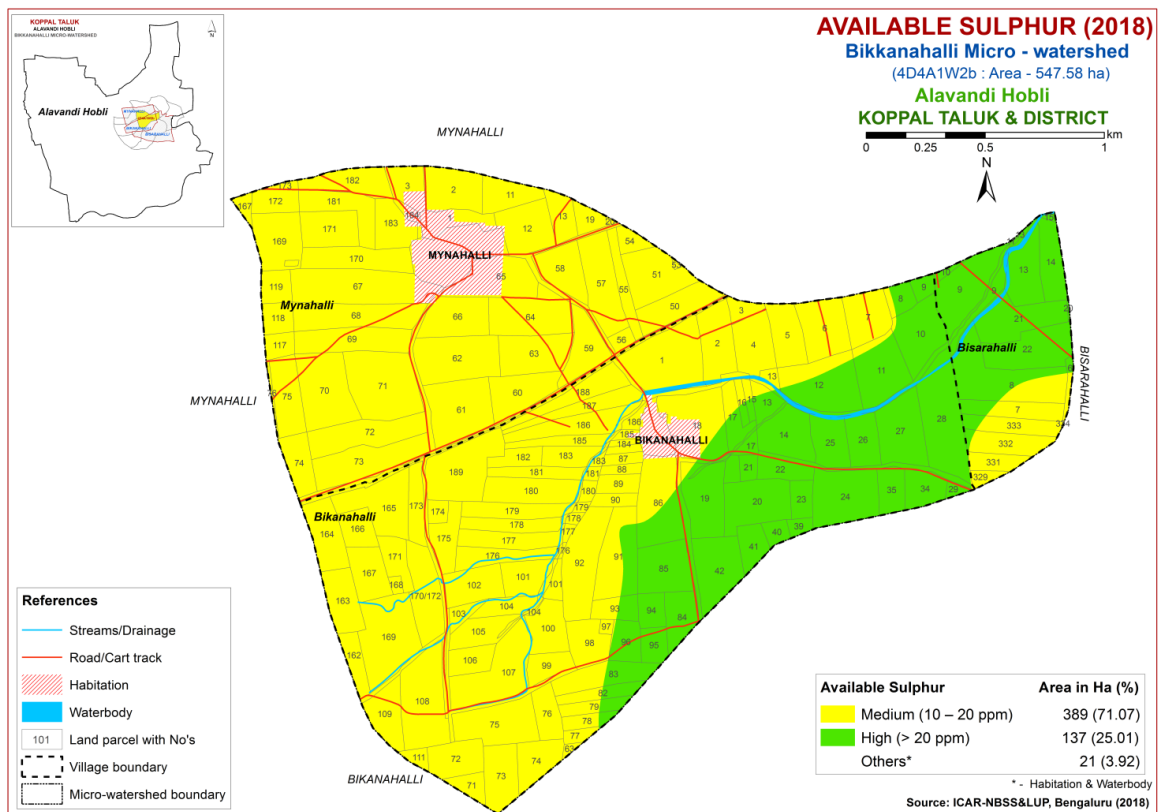


Fig.6.6 Soil Available Sulphur map of Bikkanahalli Microwatershed

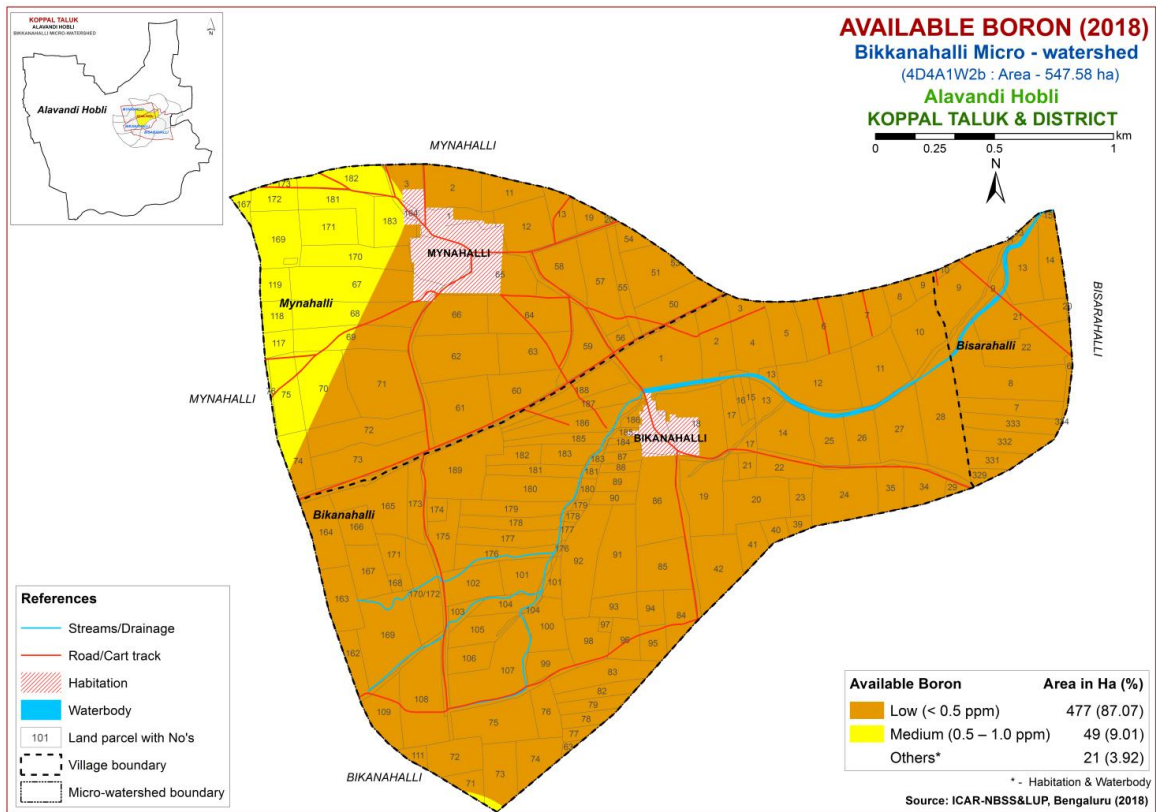


Fig.6.7 Soil Available Boron map of Bikkanahalli Microwatershed

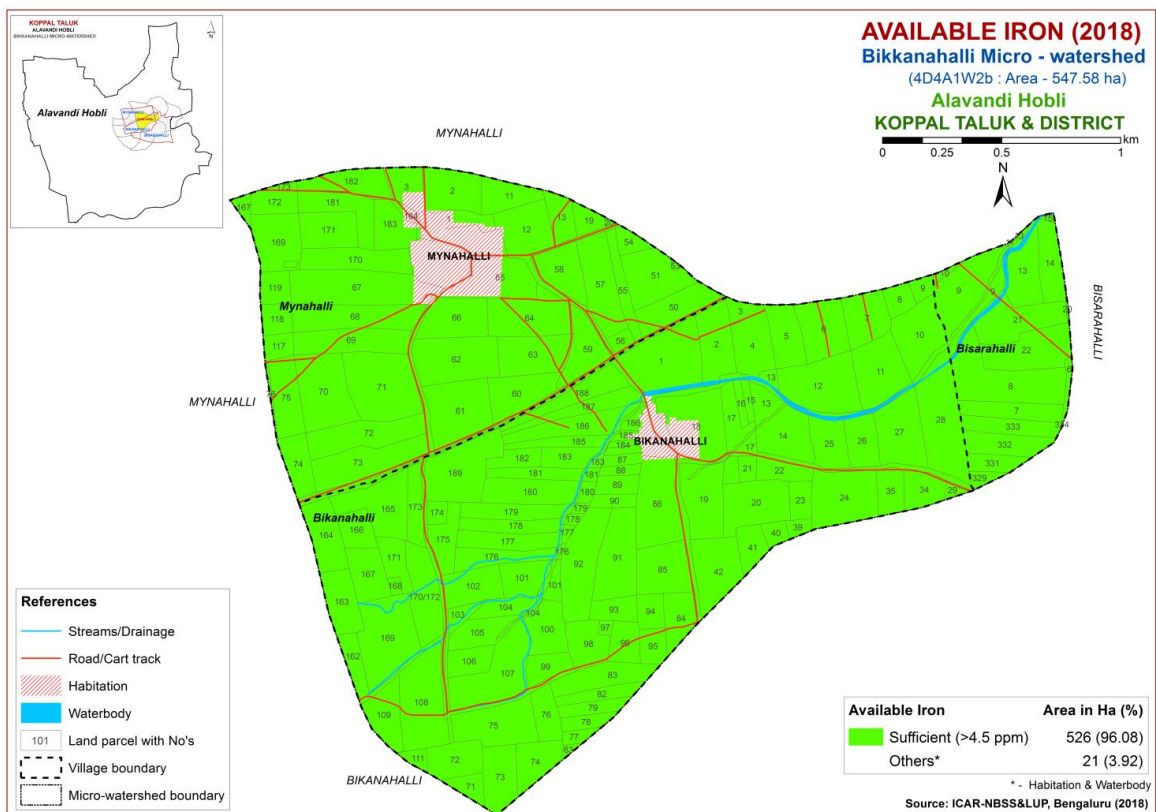


Fig.6.8 Soil Available Iron map of Bikkanahalli Microwatershed

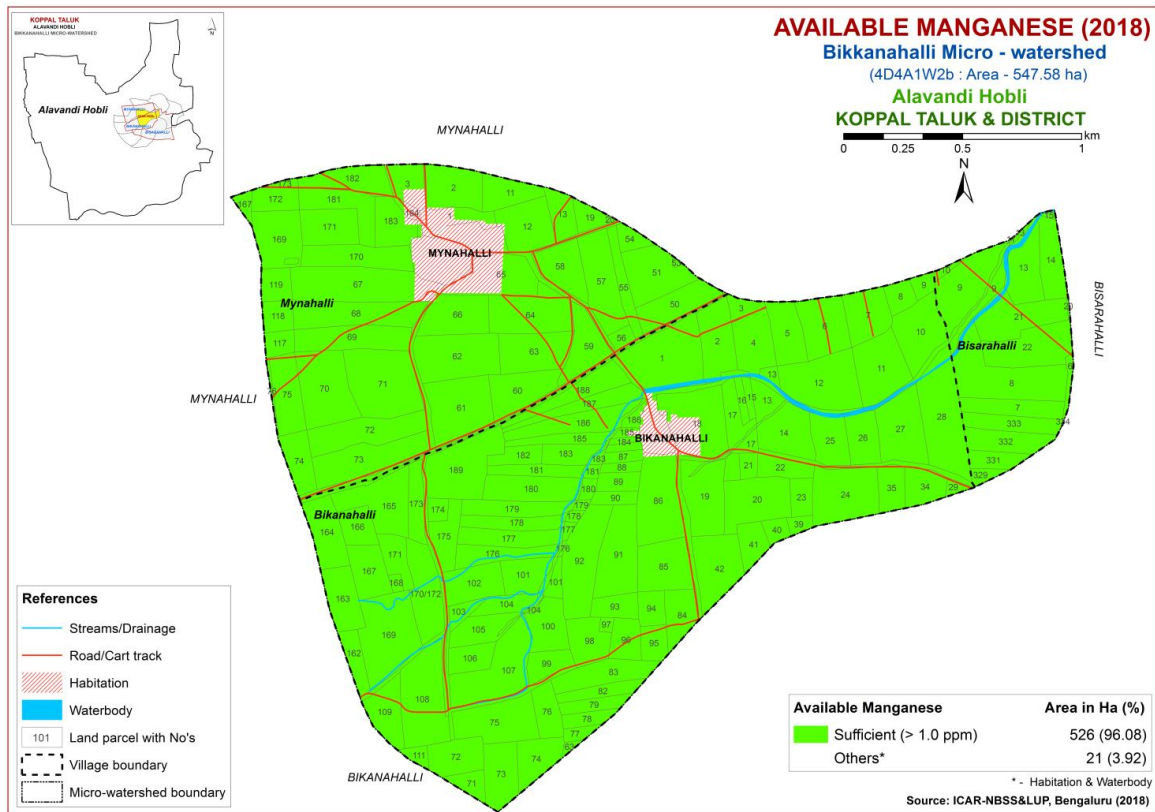


Fig.6.9 Soil Available Manganese map of Bikkanahalli Microwatershed

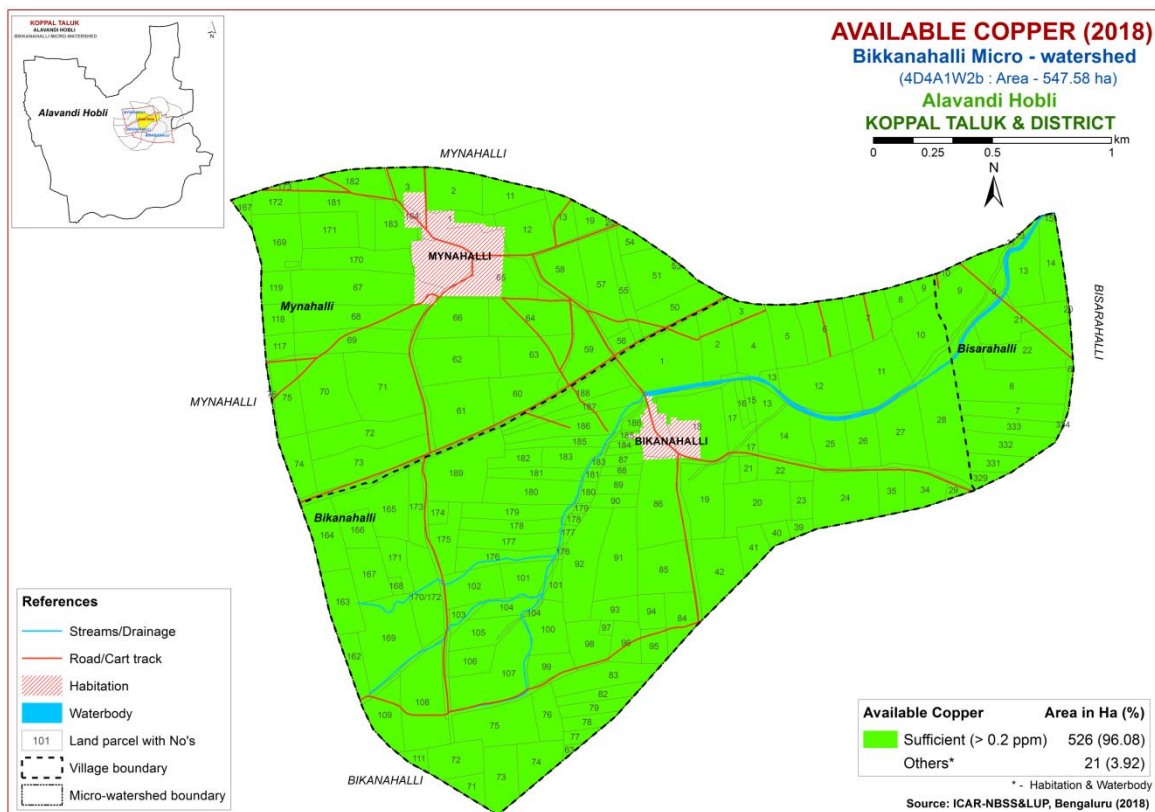


Fig.6.10 Soil Available Copper map of Bikkanahalli Microwatershed

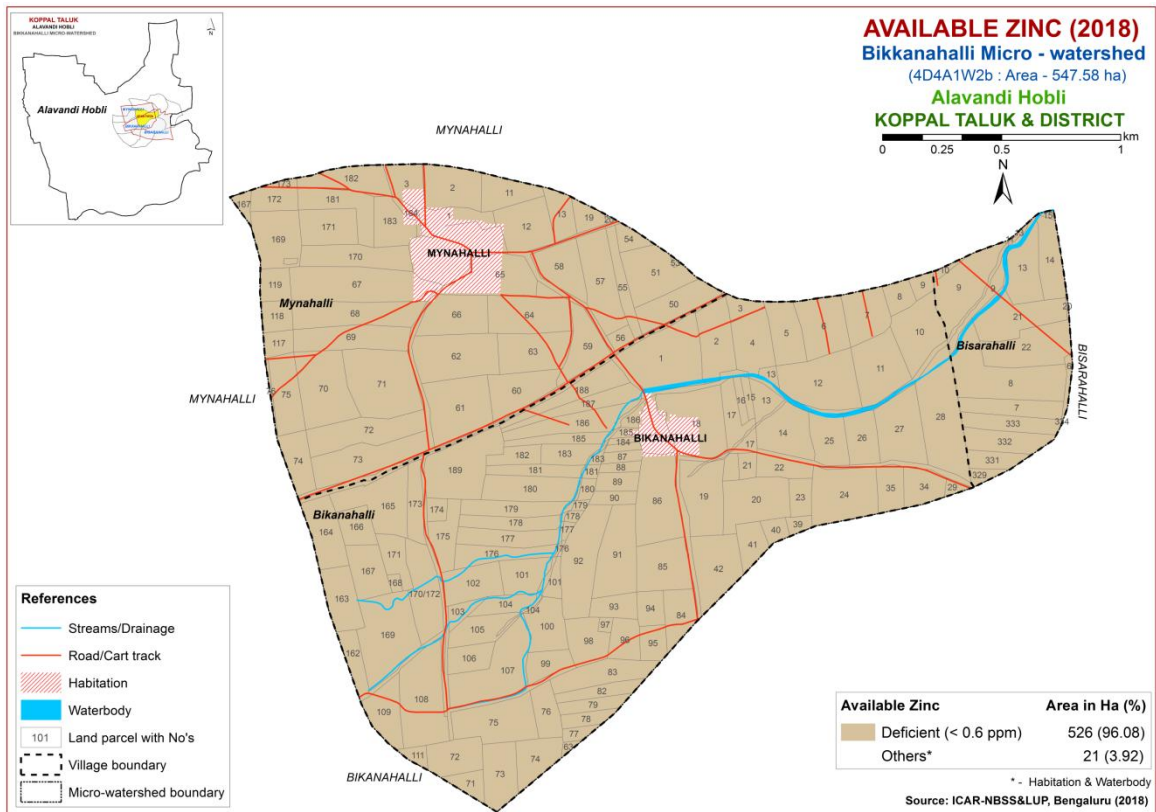


Fig.6.11 Soil Available Zinc map of Bikkanahalli Microwatershed

LAND SUITABILITY FOR MAJOR CROPS

The soil and land resource units (soil phases) of Bikkanahalli microwatershed were assessed for their suitability for growing food, fodder, fibre and other horticulture crops by following the procedure as outlined in FAO, 1976 and 1983. Crop requirements were developed for each of the crop from the available research data and also by referring to Naidu *et. al.* (2006) and Natarajan *et. al* (2015). The soil and land characteristics were matched with the crop requirements to arrive at the crop suitability. The soil and land characteristics table (Table 7.1) were matched with the crop requirements (Tables 7.2-7.32) to arrive at the crop suitability. In FAO land suitability classification, two orders are recognized. Order S- Suitable and Order N- Not suitable. The orders have classes, subclasses and units. Order-S has three classes, Class S1- Highly Suitable, Class S2- Moderately Suitable and Class S3- Marginally Suitable. Order N has two Classes, N1- Currently not Suitable and N2- Permanently not Suitable. There are no subclasses within the Class S1 as they will have very minor or no limitations for crop growth. Classes S2, S3 and N1 are divided into subclasses based on the kinds of limitations encountered. The limitations that affect crop production are ‘c’ for erratic rainfall and its distribution and length of growing period (LGP), ‘e’ for erosion hazard, ‘r’ for rooting condition, ‘t’ for lighter or heavy texture, ‘g’ for gravelliness or stoniness, ‘n’ for nutrient availability, ‘l’ for topography, ‘m’ for moisture availability, ‘s’ for sodium ‘z’ for calcareousness and ‘w’ for drainage. These limitations are indicated as lower case letters to the class symbol. For example, moderately suitable lands with the limitations of soil depth and erosion are designated as S2re. For the microwatershed, the soil mapping units were evaluated and classified up to subclass level.

Using the above criteria, the soil map units of the microwatershed were evaluated and land suitability maps for 31 major agricultural and horticultural crops were generated. The detailed information on the kind of suitability of each of the soil phase for the crops assessed are given village/ survey number wise for the microwatershed in Appendix-III.

7.1 Land Suitability for Sorghum (*Sorghum bicolor*)

Sorghum is one of the major crop grown in Karnataka in an area of 10.47 lakh ha in Bijapur, Gulbarga, Raichur, Bidar, Belgaum, Dharwad, Bellary, Chitradurga, Mysore and Chamarajnar district. The crop requirements for growing sorghum (Table 7.2) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing sorghum was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.1.

Highly suitable (Class S1) lands occupy an area of about 174 ha (32%) for growing sorghum and occur in the northern, northwestern, western, eastern and southern part of the microwatershed. Maximum area of about 182 ha (33%) is moderately suitable

(Class S2) for growing sorghum and distributed in all part of the microwatershed with minor limitations of calcareousness, rooting depth, nutrient availability and gravelliness. An area of about 171 ha (31%) is marginally suitable for growing sorghum and distributed in the northern, central, western, southern and eastern part of the microwatershed. They have moderate limitations of gravelliness, calcareousness and rooting depth.

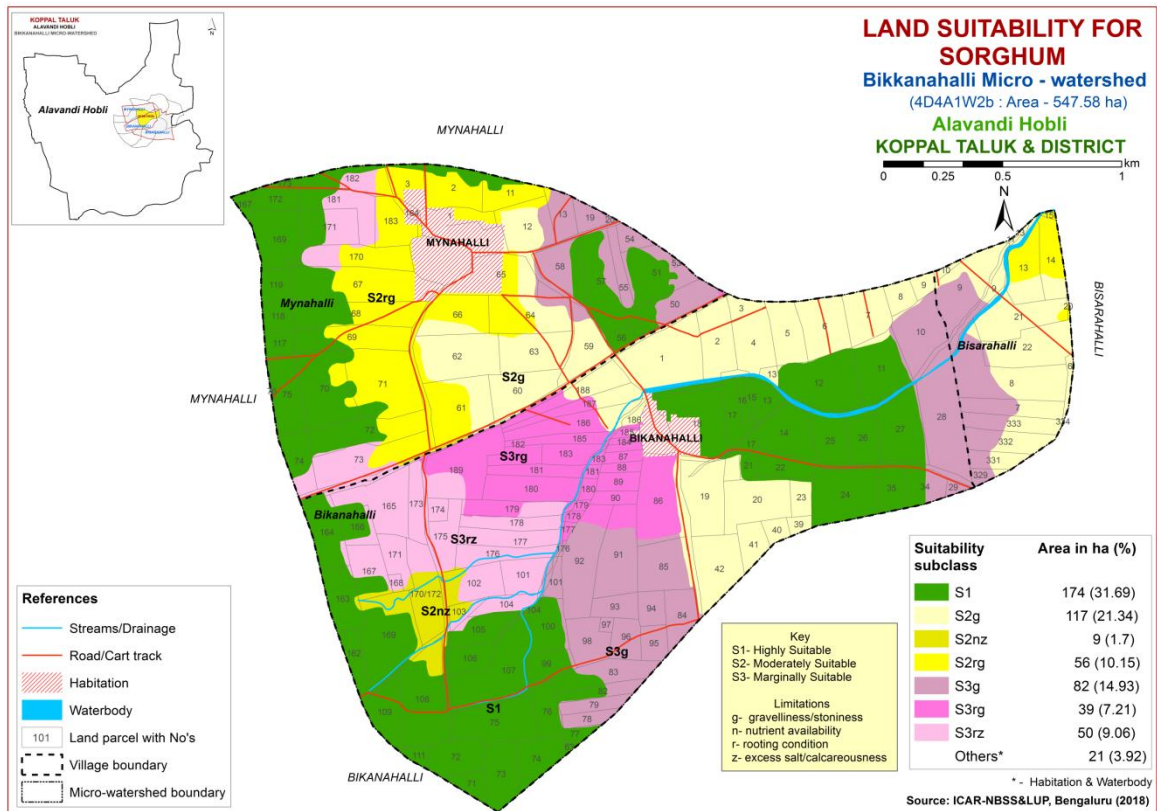


Fig. 7.1 Land Suitability map of Sorghum

7.2 Land Suitability for Maize (*Zea mays*)

Maize is one of the most important food crop grown in an area of 13.37 lakh ha in almost all the districts of the State. The crop requirements for growing maize (Table 7.3) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing maize was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.2.

Highly suitable (Class S1) lands occupy an area of about 42 ha (8%) for growing maize and distributed in the eastern part of the microwatershed. Maximum area of about 313 ha (58%) is moderately suitable (Class S2) and distributed in all part of the microwatershed with minor limitations of calcareousness, texture, rooting depth and gravelliness. Marginally suitable (Class S3) lands cover an area of about 171 ha (31%) and occur in the northern, central, western, eastern and southern part of the microwatershed. They have moderate limitations of gravelliness, texture, calcareousness and rooting depth.

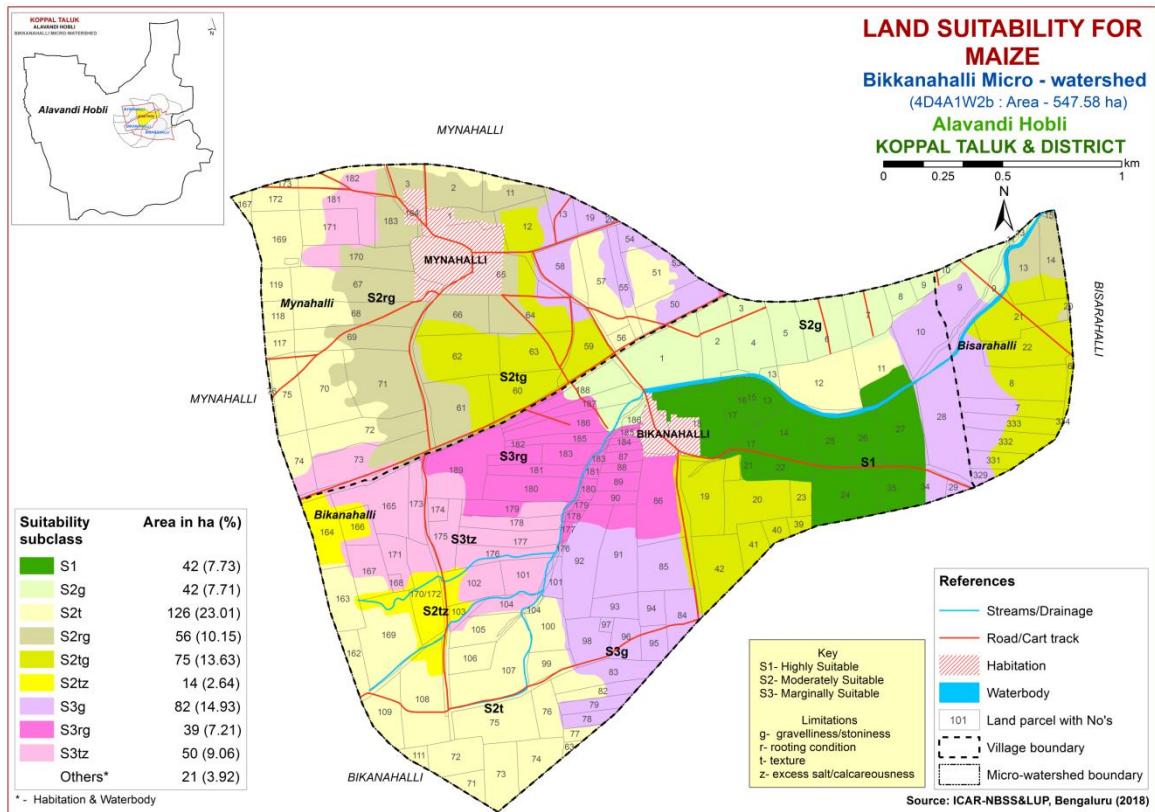


Fig. 7.2 Land Suitability map of Maize

7.3 Land Suitability for Bajra (*Pennisetum glaucum*)

Bajra is one of the major food crop grown in an area of 2.34 lakh ha in Karnataka in the northern districts. The crop requirements (Table 7.4) for growing bajra were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing bajra was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.3.

Highly suitable (Class S1) lands occupy an area of about 119 ha (22%) for growing bajra and occur in the eastern part of the microwatershed. Maximum area of about 250 ha (45%) is moderately suitable (Class S2) for growing bajra and distributed in all part of the microwatershed with minor limitations of texture, calcareousness, rooting depth and gravelliness. Marginally suitable (Class S3) lands cover an area of about 157 ha (29%) and occur in the northern, western and central part of the microwatershed. They have moderate limitations of gravelliness, texture, rooting depth and calacareousness.

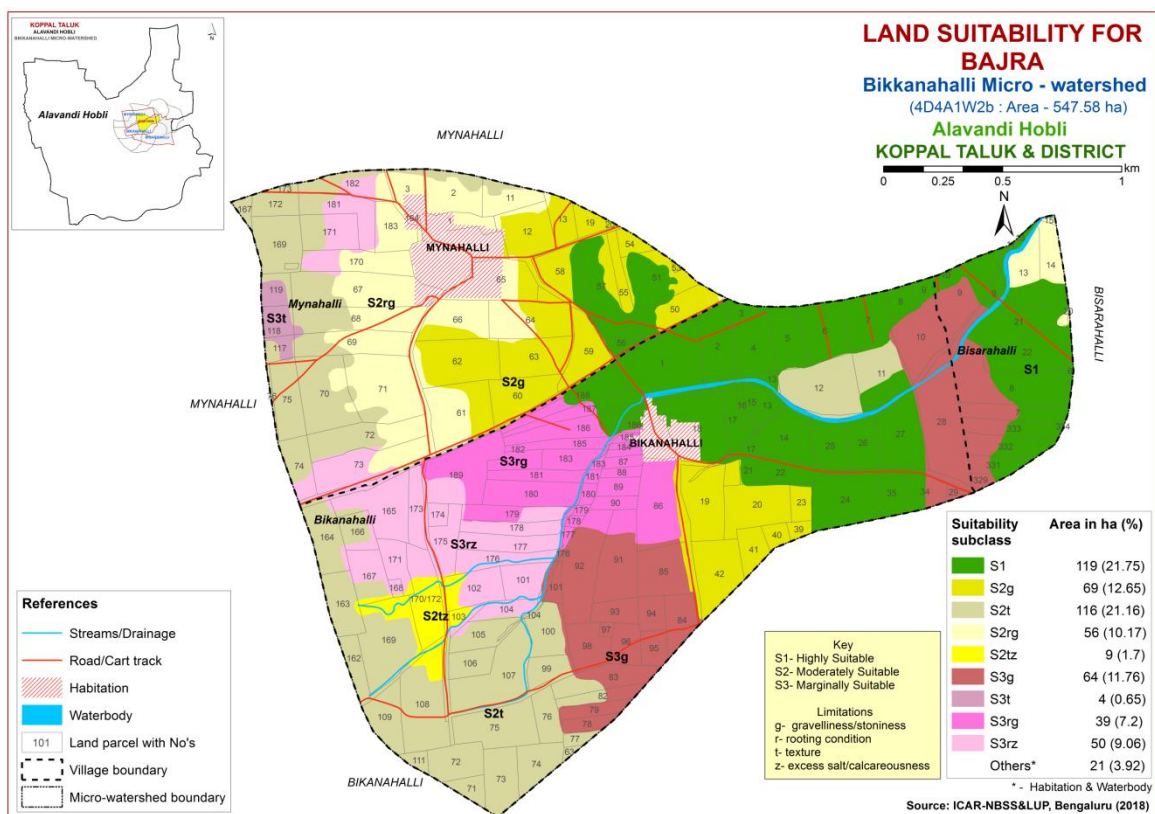


Fig. 7.3 Land Suitability map of Bajra

7.4 Land Suitability for Groundnut (*Arachis hypogaea*)

Groundnut is one of the major oilseed crop grown in an area of 6.54 lakh ha in Karnataka in most of the districts either as rainfed or irrigated crop. The crop requirements for growing groundnut (Table 7.5) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing groundnut was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.4.

An area of about 12 ha (2%) is highly suitable (Class S1) for growing groundnut and are distributed in the northern part of the microwatershed. A maximum area of about 271 ha (49%) is moderately suitable (Class S2) for growing groundnut and distributed in the major part of the microwatershed. They have minor limitations of gravelliness, rooting depth and texture. An area of about 243 ha (45%) is marginally suitable (Class S3) for growing groundnut and are distributed in the northern, western, southern, central and eastern part of the microwatershed with moderate limitations of gravelliness, texture, rooting depth and calcareousness.

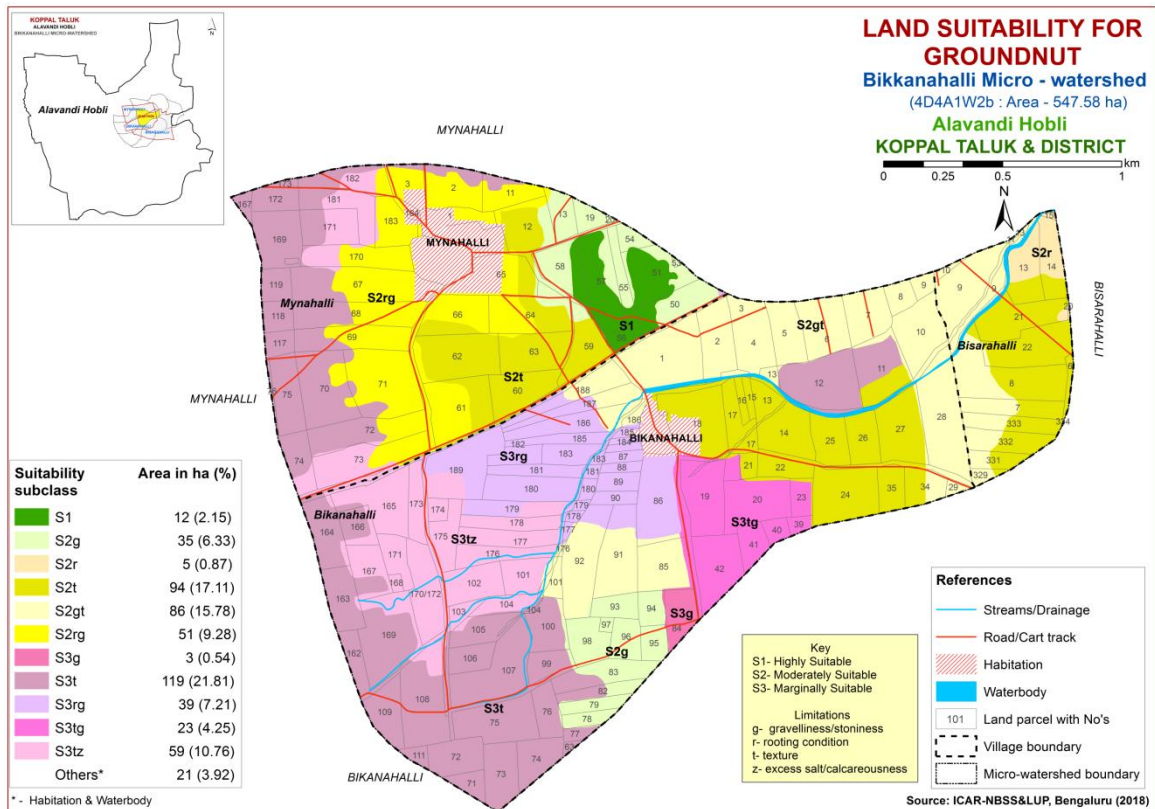


Fig. 7.4 Land Suitability map of Groundnut

7.5 Land Suitability for Sunflower (*Helianthus annuus*)

Sunflower is one of the most important oilseed crop grown in an area of 3.56 lakh ha in the State in all the districts. The crop requirements for growing sunflower (Table 7.6) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing sunflower was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.5.

Maximum area of about 168 ha (31%) is highly suitable (Class S1) for growing sunflower and are distributed in all part of the microwatershed. An area of about 132 ha (24%) is moderately suitable (Class S2) and are distributed in the northern, western, eastern and southern part of the microwatershed. They have minor limitations of rooting depth, gravelliness and calcareousness. Marginally suitable (Class S3) lands occupy an area of about 137 ha (25%) and are distributed in the northern, eastern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness. An area of about 89 ha (16%) is currently not suitable (Class N1) for growing sunflower and are distributed in the northern, western and southern part of the microwatershed with severe limitations of rooting depth, gravelliness and calcareousness.

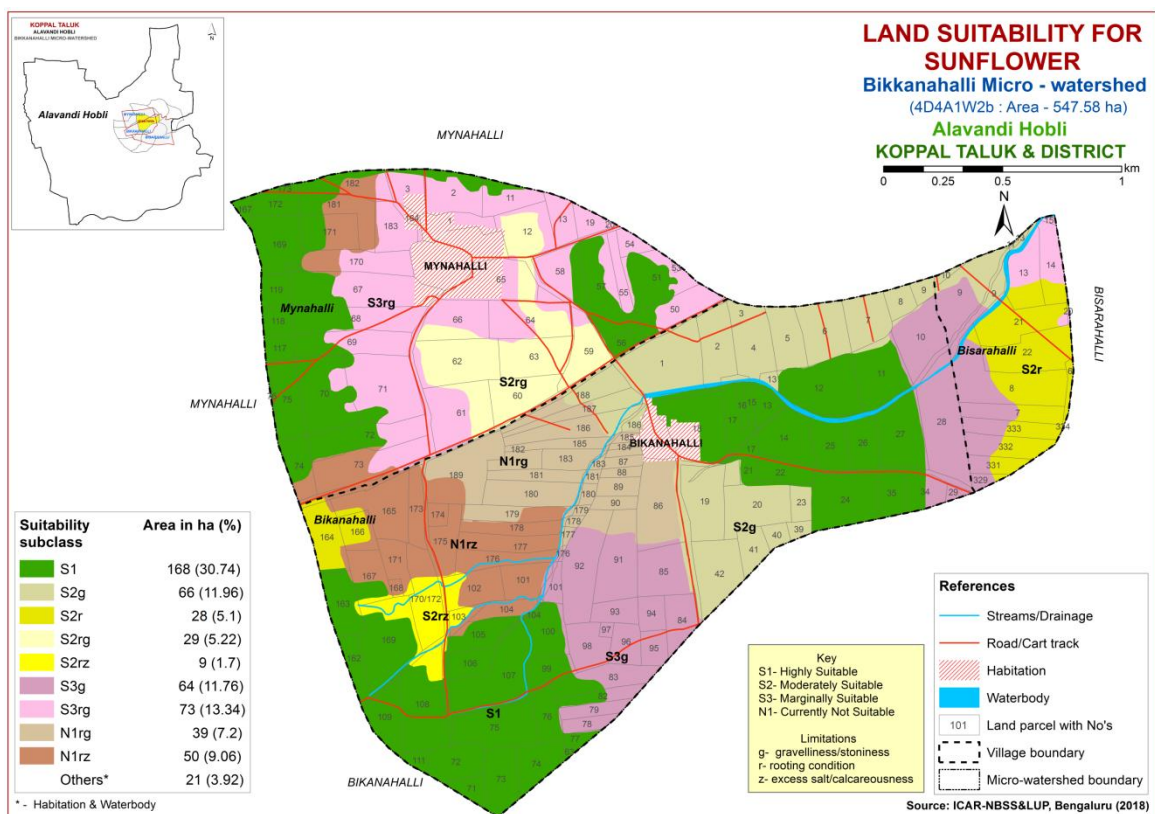


Fig. 7.5 Land Suitability map of Sunflower

7.6 Land Suitability for Redgram (*Cajanus cajan*)

Redgram is one of the most important pulse crop grown in an area of 7.28 lakh ha in almost all the districts of the State. The crop requirements for growing redgram (Table 7.7) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing redgram was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.6.

Highly suitable (Class S1) lands for growing Redgram occupy an area of about 54 ha (10%) and are distributed in the northeastern and eastern part of the microwatershed. Maximum area of about 237 ha (43%) is moderately suitable (Class S2) for Redgram and are distributed in all part of the microwatershed. They have minor limitations of rooting depth, gravelliness and texture. An area of about 147 ha (27%) is marginally suitable lands (Class S3) for growing Redgram and are distributed in the northern, eastern and southern part of the microwatershed with major limitations of rooting depth, gravelliness and calcareousness. An area of about 89 ha (16%) is currently not suitable (Class N1) for growing Redgram and are distributed in the northern and western part of the microwatershed with severe limitations of rooting depth, gravelliness and calcareousness.

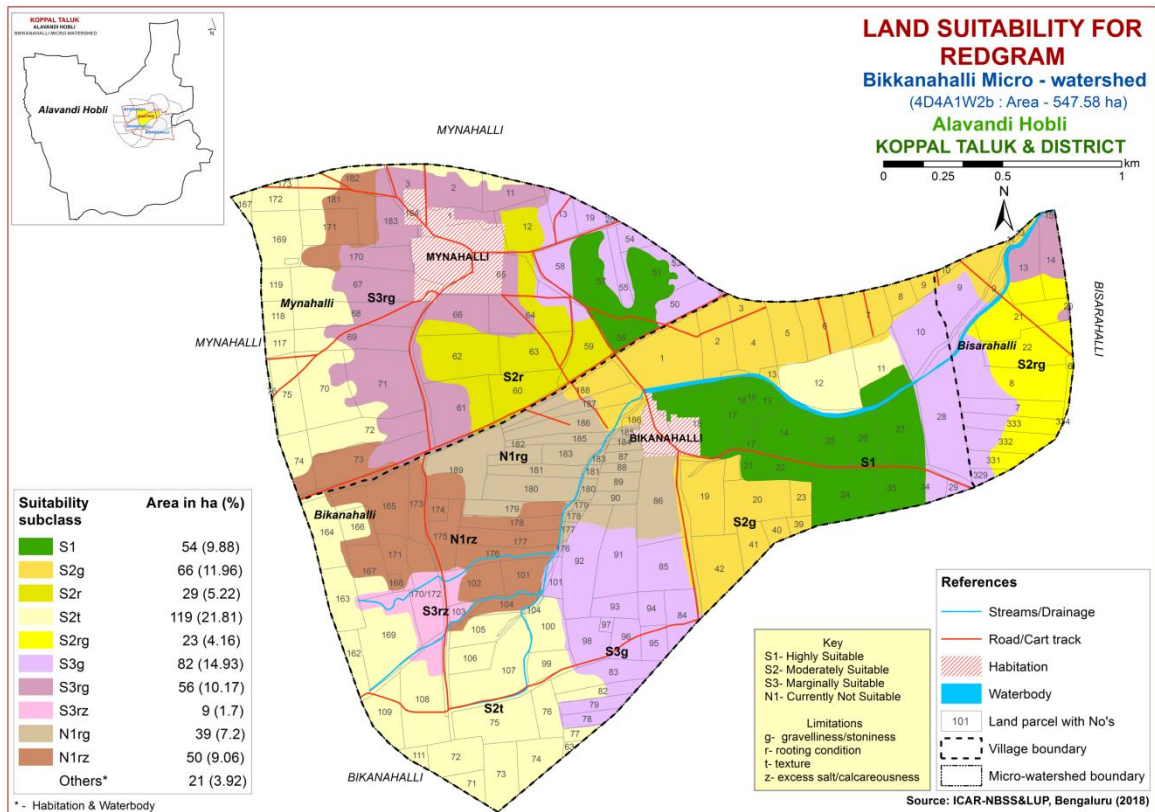


Fig. 7.6 Land Suitability map of Redgram

7.7 Land Suitability for Bengal gram (*Cicer arietinum*)

Bengal gram is one of the major pulse crop grown in an area of 9.39 lakh ha in northern Karnataka in Bijapur, Gulbarga, Raichur, Bidar, Belgaum, Dharwad and Bellary districts. The crop requirements for growing Bengal gram (Table 7.8) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing Bengal gram was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.7.

An area of about 119 ha (22%) in the microwatershed has soils that are highly suitable (Class S1) for growing Bengal gram and are distributed in the northern, western, eastern and southern part of the microwatershed. Maximum area of about 236 ha (43%) is moderately suitable (Class S2) for growing Bengal gram and are distributed in all part of the microwatershed. They have minor limitations of texture, calcareousness, rooting depth and gravelliness. Marginally suitable (Class S3) lands cover an area of about 171 ha (31%) and are distributed in the northern, western, central and eastern part of the microwatershed. They have moderate limitations of gravelliness, texture, rooting depth and calcareousness.

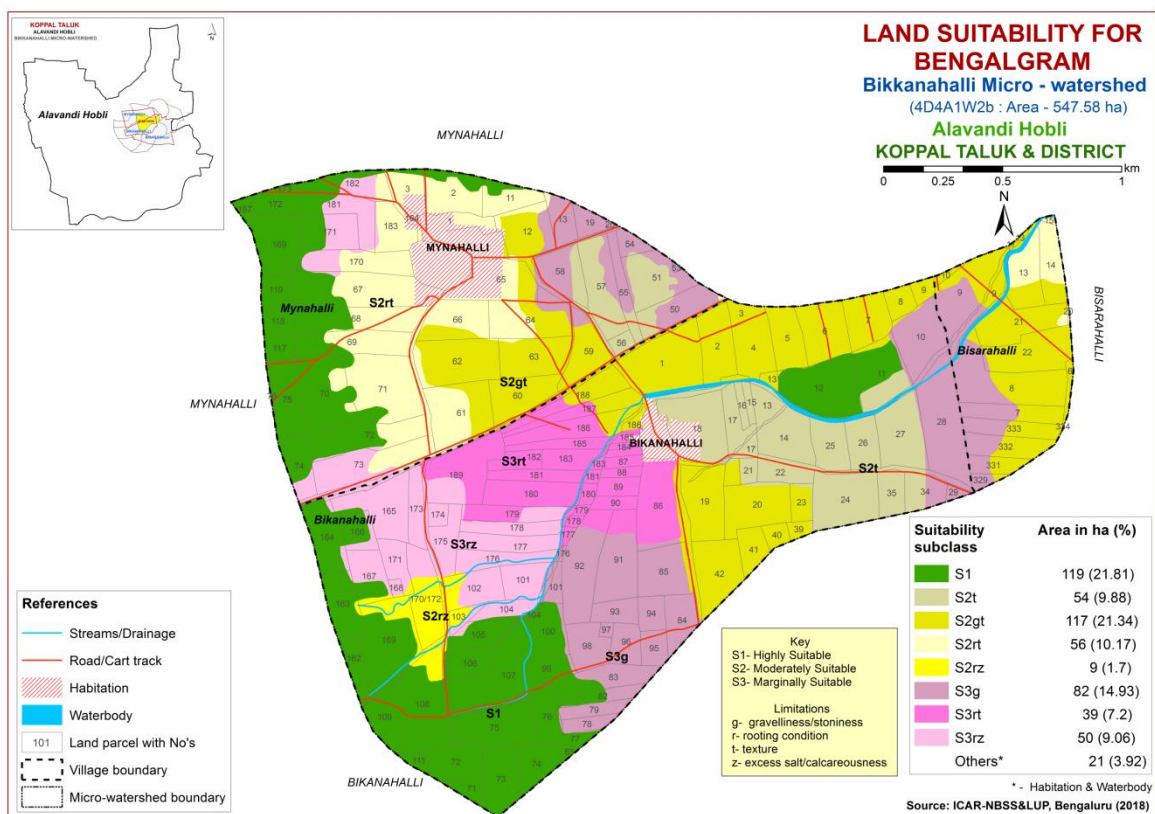


Fig. 7.7 Land Suitability map of Bengal gram

7.8 Land Suitability for Cotton (*Gossypium hirsutum*)

Cotton is one of the most important fibre crop grown in the State in about 8.75 lakh ha area in Raichur, Dharwad, Belgaum, Gulbarga, Bijapur, Bidar, Bellary, Chitradurga and Chamarajnagar districts. The crop requirements for growing cotton (Table 7.9) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing cotton was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.8.

An area of about 131 ha (24%) is highly suitable (Class S1) for growing cotton and are distributed in the northern, western, southern and eastern part of the microwatershed. Maximum area of about 224 ha (41%) is moderately suitable (Class S2) and are distributed in all part of the microwatershed. They have minor limitations of rooting depth, gravelliness, calcareousness and texture. Marginally suitable (Class S3) lands occupy an area of about 170 ha (31%) and are distributed in the northern, central, western, eastern and southern part of the microwatershed with moderate limitations of rooting depth, texture, calcareousness and gravelliness.

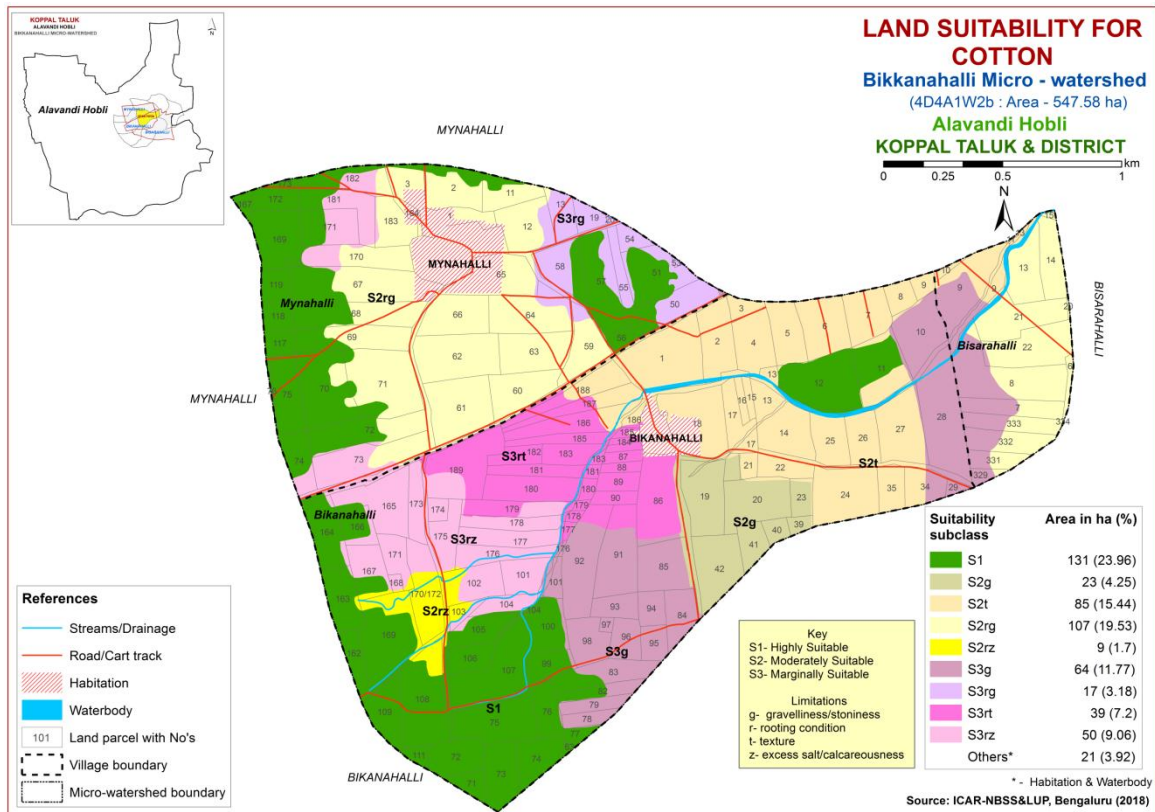


Fig. 7.8 Land Suitability map of Cotton

7.9 Land Suitability for Chilli (*Capsicum annum L*)

Chilli is one of the most important spice crop grown in an area of 0.42 lakh ha in Karnataka State. The crop requirements for growing chilli (Table 7.10) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing chilli was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.9.

An area of about 77 ha (14%) in the microwatershed has soils that are highly suitable (Class S1) for growing chilli and are distributed in the northern and eastern part of the microwatershed. An area of about 150 ha (27%) is moderately suitable (Class S2) for growing chilli and are distributed in the northern and eastern part of the microwatershed. They have minor limitations of gravelliness, texture and rooting depth. Marginally suitable (Class S3) lands cover a maximum area of about 299 ha (55%) and distributed in the major part of the microwatershed. They have major limitations of gravelliness, texture, rooting depth and calcareousness.

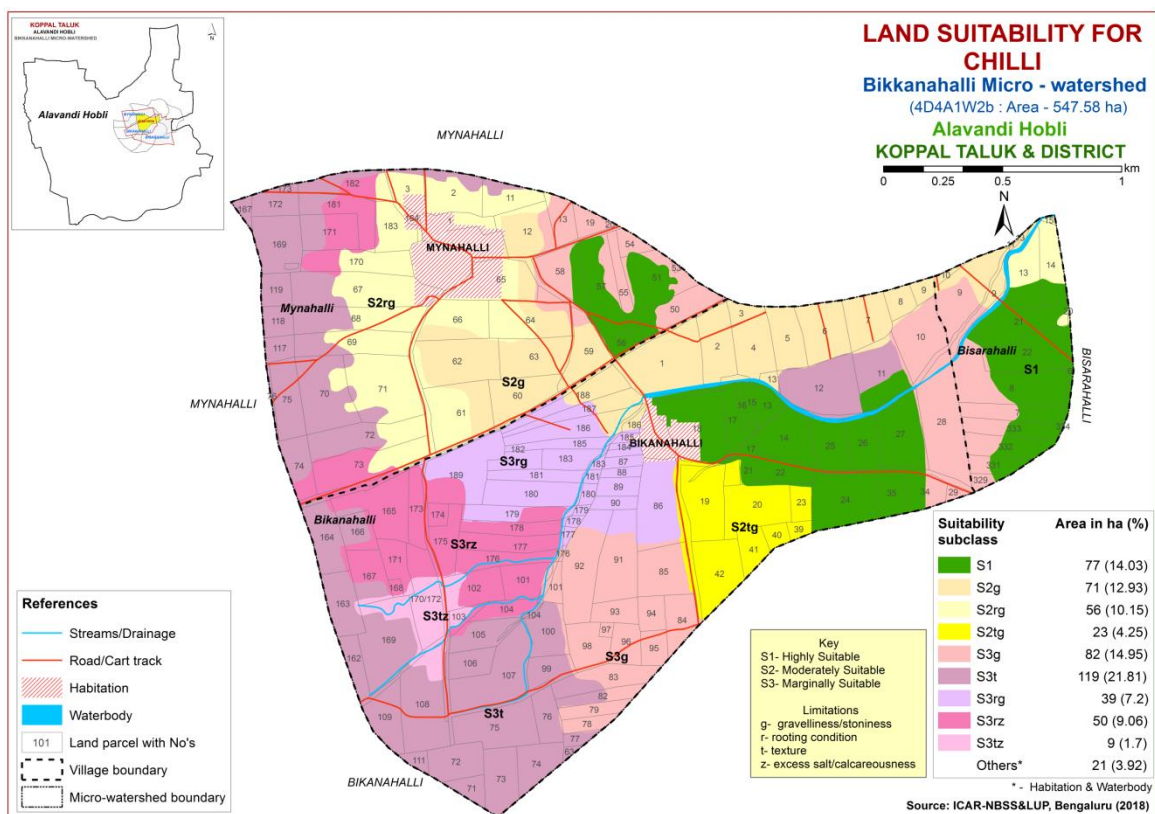


Fig. 7.9 Land Suitability map of Chilli

7.10 Land Suitability for Tomato (*Solanum lycopersicum*)

Tomato is one of the most important vegetable crop grown in an area of 0.65 lakh ha in almost all the districts of the State. The crop requirements (Table 7.11) for growing tomato were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing tomato was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.10.

An area of about 77 ha (14%) in the microwatershed has soils that are highly suitable (Class S1) for growing tomato and are distributed in the northern and eastern part of the microwatershed. An area of about 150 ha (27%) is moderately suitable (Class S2) for growing tomato and are distributed in the northern and eastern part of the microwatershed. They have minor limitations of gravelliness, rooting depth and texture. Marginally suitable (Class S3) lands cover a maximum area of about 299 ha (55%) and distributed in the major part of the microwatershed. They have moderate limitations of gravelliness, texture, rooting depth, drainage and calcareousness.

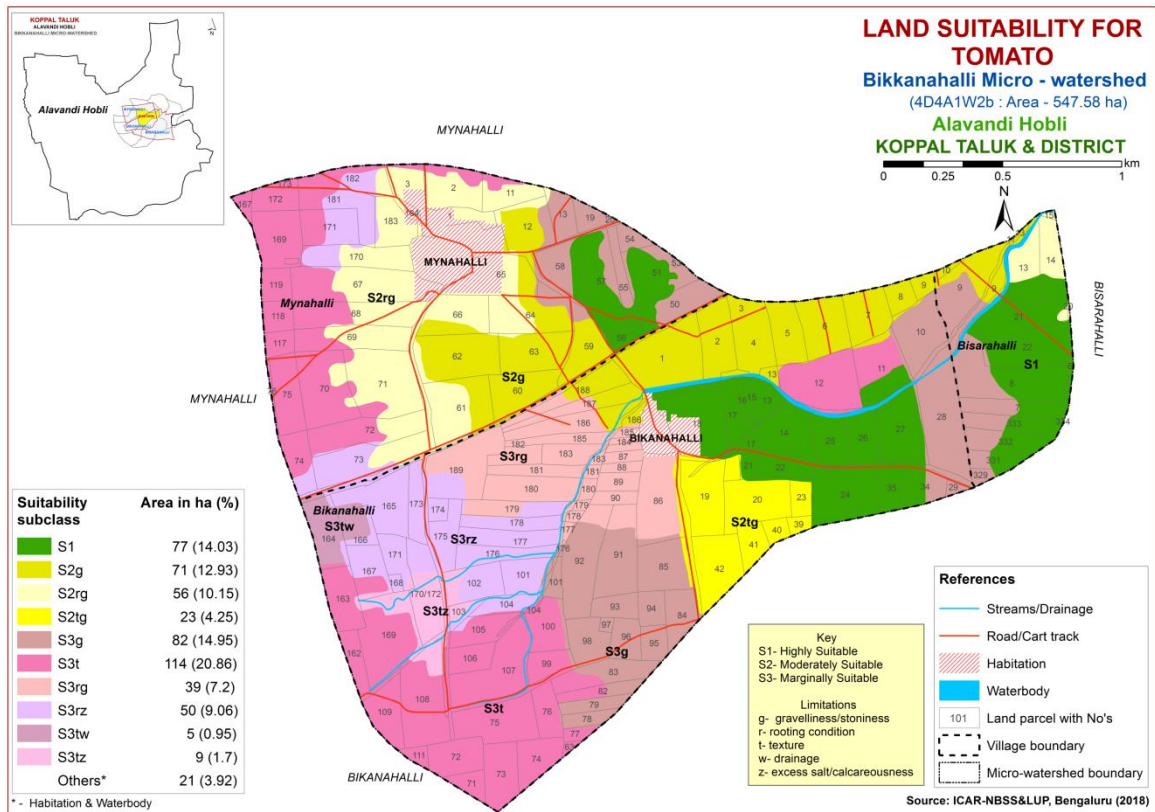


Fig. 7.10 Land Suitability map of Tomato

7.11 Land Suitability for Brinjal (*Solanum melongena*)

Brinjal is one of the most important vegetable crop grown in the state. The crop requirements for growing brinjal (Table 7.12) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing brinjal was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.11.

Highly (Class S1) suitable lands for growing brinjal occur in an area of 159 ha (29%) and are distributed in the northern and eastern part of the microwatershed. Maximum area of about 209 ha (39%) is moderately suitable (Class S2) for growing brinjal and are distributed in the all part of the microwatershed. They have minor limitations of rooting depth, texture, gravelliness and calcareousness. An area of about 157 ha (28%) is marginally suitable (Class S3) and are distributed in the northern, central and western part of the microwatershed with moderate limitations of rooting depth and gravelliness.

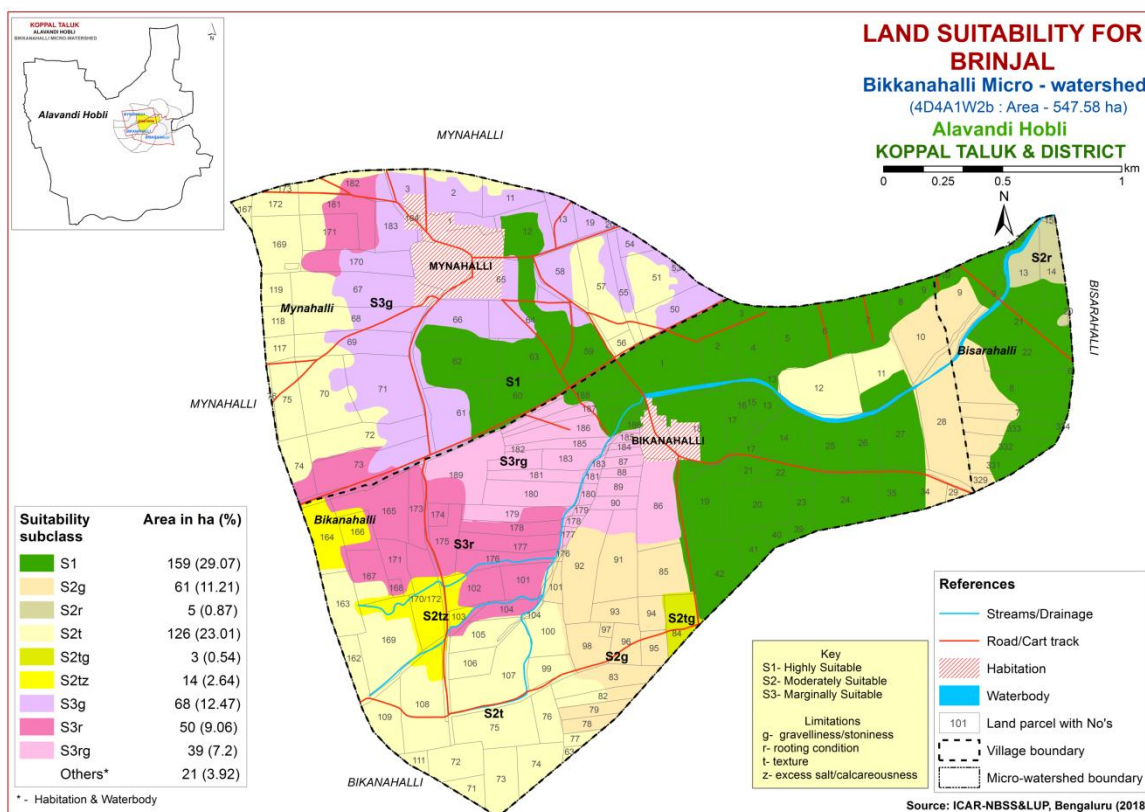


Fig 7.11 Land Suitability map of Brinjal

7.12 Land Suitability for Onion (*Allium cepa* L.,)

Onion is one of the most important vegetable crop grown in the state. The crop requirements for growing onion (Table 7.13) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing onion was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.12.

Highly (Class S1) suitable lands for growing onion occur in an area of 108 ha (20%) and are distributed in the eastern part of the microwatershed. An area of about 132 ha (24%) is moderately suitable (Class S2) for growing onion and are distributed in the northern, eastern and southern part of the microwatershed. They have minor limitations of rooting depth, texture and gravelliness. Maximum area of 285 ha (52%) is marginally suitable and are distributed in all parts of the microwatershed with major limitations of rooting depth, gravelliness, calcareousness and texture.

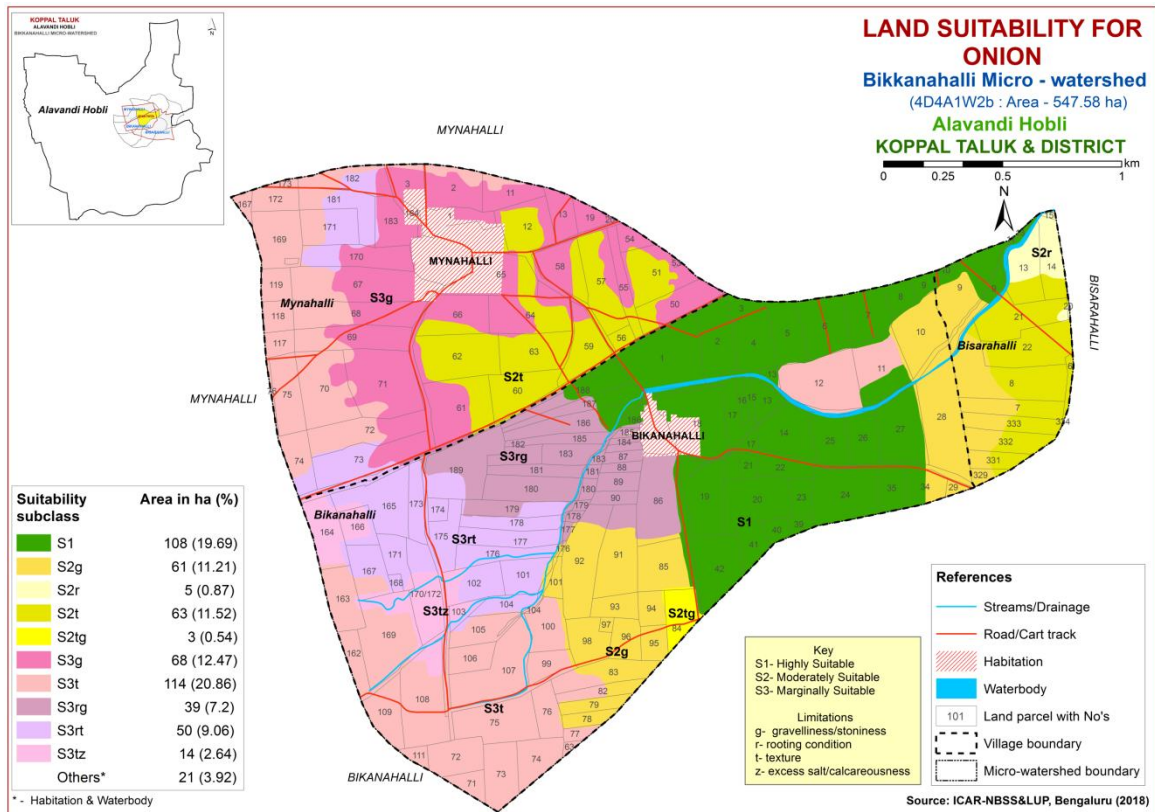


Fig 7.12 Land Suitability map of Onion

7.13 Land Suitability for Bhendi (*Abelmoschus esculentus*)

Bhendi is one of the most important vegetable crop grown in the state. The crop requirements for growing bhendi (Table 7.14) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing bhendi was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.13.

Highly (Class S1) suitable lands for growing bhendi occur in an area of about 108 ha (20%) and are distributed in the eastern part of the microwatershed. Maximum area of about 260 ha (48%) is moderately suitable (Class S2) for growing bhendi and are distributed in all part of the microwatershed. They have minor limitations of texture, rooting depth, gravelliness and calcareousness. An area of 157 ha (28%) is marginally suitable for growing bhendi and are distributed in the northern, western and central part of the microwatershed with major limitations of rooting depth and gravelliness.

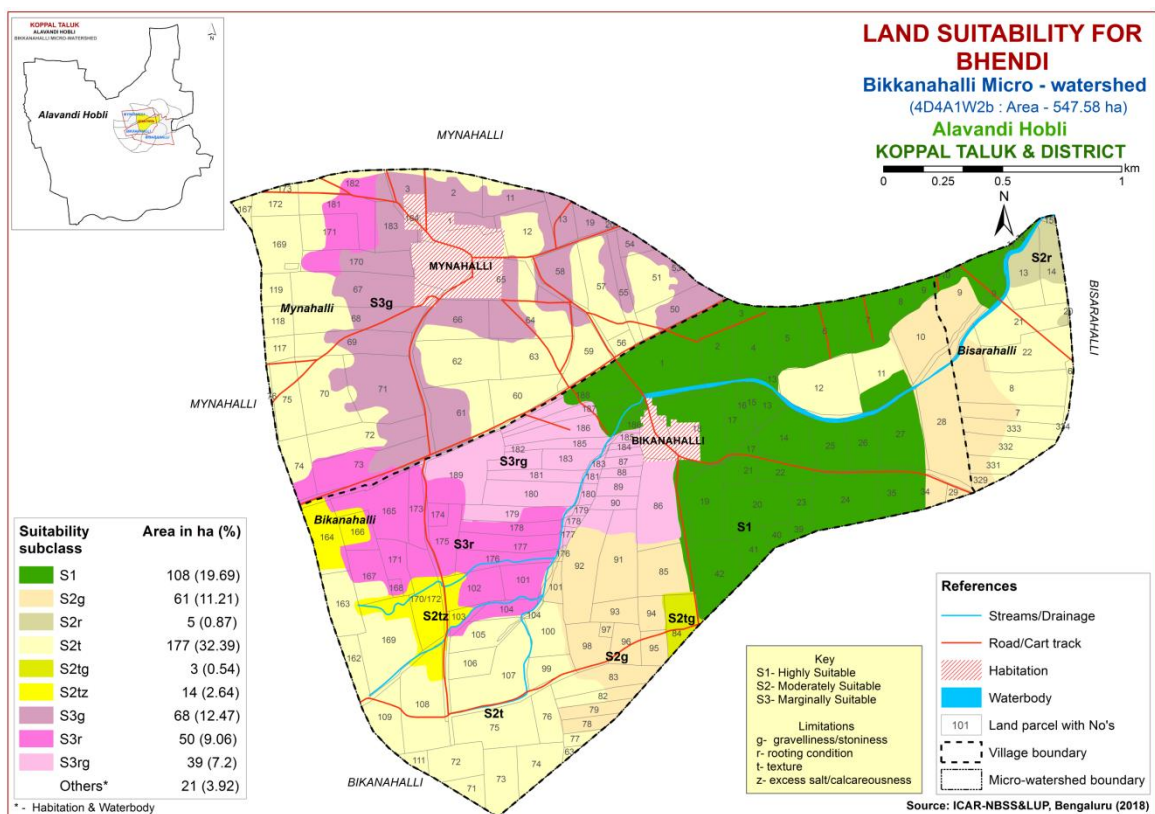


Fig 7.13 Land Suitability map of Bhendi

7.14 Land Suitability for Drumstick (*Moringa oleifera*)

Drumstick is one of the most important vegetable crop grown in 2403 ha area in the state. The crop requirements for growing drumstick (Table 7.15) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing drumstick was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.14.

Highly suitable (Class S1) lands for growing Drumstick occupy an area of about 96 ha (18%) and are distributed in the northeastern and eastern part of the microwatershed. Maximum area of about 265 ha (48%) is moderately suitable (Class S2) for Drumstick and are distributed in all part of the microwatershed. They have minor limitations of rooting depth, gravelliness, calcareousness and texture. An area of about 76 ha (14%) is marginally suitable lands (Class S3) for growing Drumstick and are distributed in the northern, eastern and southern part of the microwatershed with major limitations of rooting depth and gravelliness. An area of about 89 ha (16%) is currently not suitable (Class N1) for growing Drumstick and are distributed in the northern, central and western part of the microwatershed with severe limitations of rooting depth, gravelliness and calcareousness.

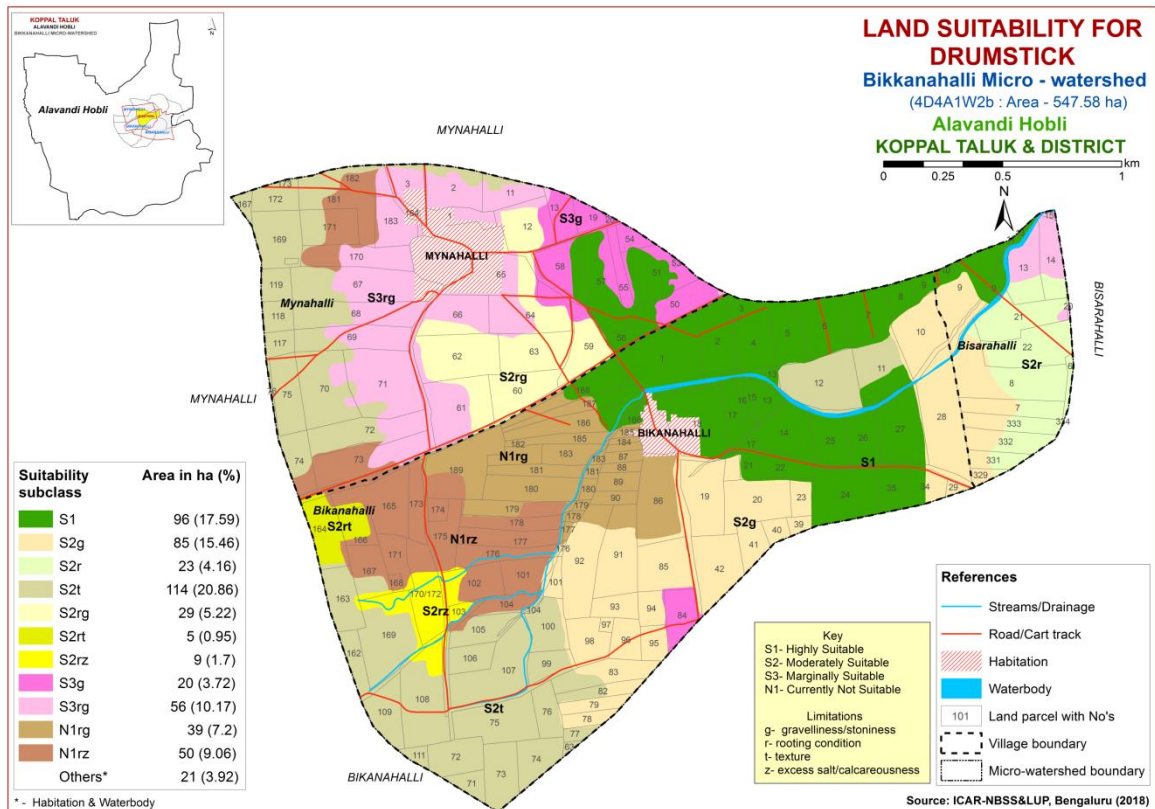


Fig. 7.14 Land Suitability map of Drumstick

7.15 Land suitability for Mango (*Mangifera indica*)

Mango is one of the most important fruit crop grown in about 1.73 lakh ha in almost all the districts of the State. The crop requirements (Table 7.16) for growing mango were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing mango was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.15.

Highly suitable (Class S1) lands for growing Mango occupy an area of about 12 ha (2%) and are distributed in the northeastern part of the microwatershed. An area of about 107 ha (20%) is moderately suitable (Class S2) for Mango and are distributed in the eastern part of the microwatershed. They have minor limitations of rooting depth and gravelliness. Maximum area of about 261 ha (48%) is marginally suitable lands (Class S3) for growing Mango and are distributed in all part of the microwatershed with major limitations of rooting depth, texture, calcareousness and gravelliness. An area of about 145 ha (26%) is currently not suitable (Class N1) for growing Mango and are distributed in the northern, eastern, central, southern and western part of the microwatershed with severe limitations of rooting depth, gravelliness and texture.

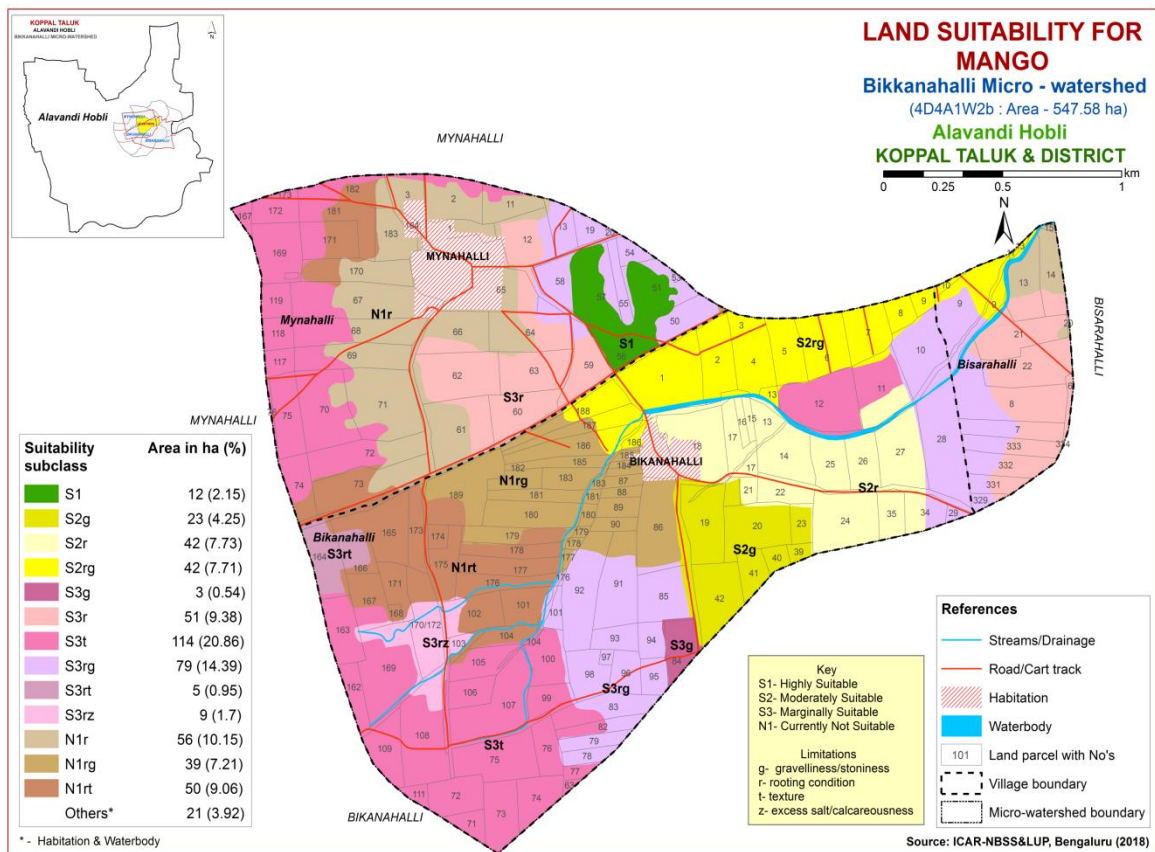


Fig. 7.15 Land Suitability map of Mango

7.16 Land suitability for Guava (*Psidium guajava*)

Guava is one of the most important fruit crop grown in an area of about 6558 ha in almost all the districts of the state. The crop requirements (Table 7.17) for growing guava were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing guava was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.16.

Highly suitable (Class S1) lands for growing guava occupy an area of about 54 ha (10%) and are distributed in the northern and eastern part of the microwatershed. An area of about 133 ha (24%) is moderately suitable (Class S2) for guava and are distributed in the northern and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness and texture. Maximum area of about 248 ha (46%) is marginally suitable lands (Class S3) for growing guava and are distributed in all part of the microwatershed with major limitations of rooting depth, texture and gravelliness. An area of about 89 ha (16%) is currently not suitable (Class N1) for growing guava and are distributed in the northern, southern and western part of the microwatershed with severe limitations of rooting depth, gravelliness and texture.

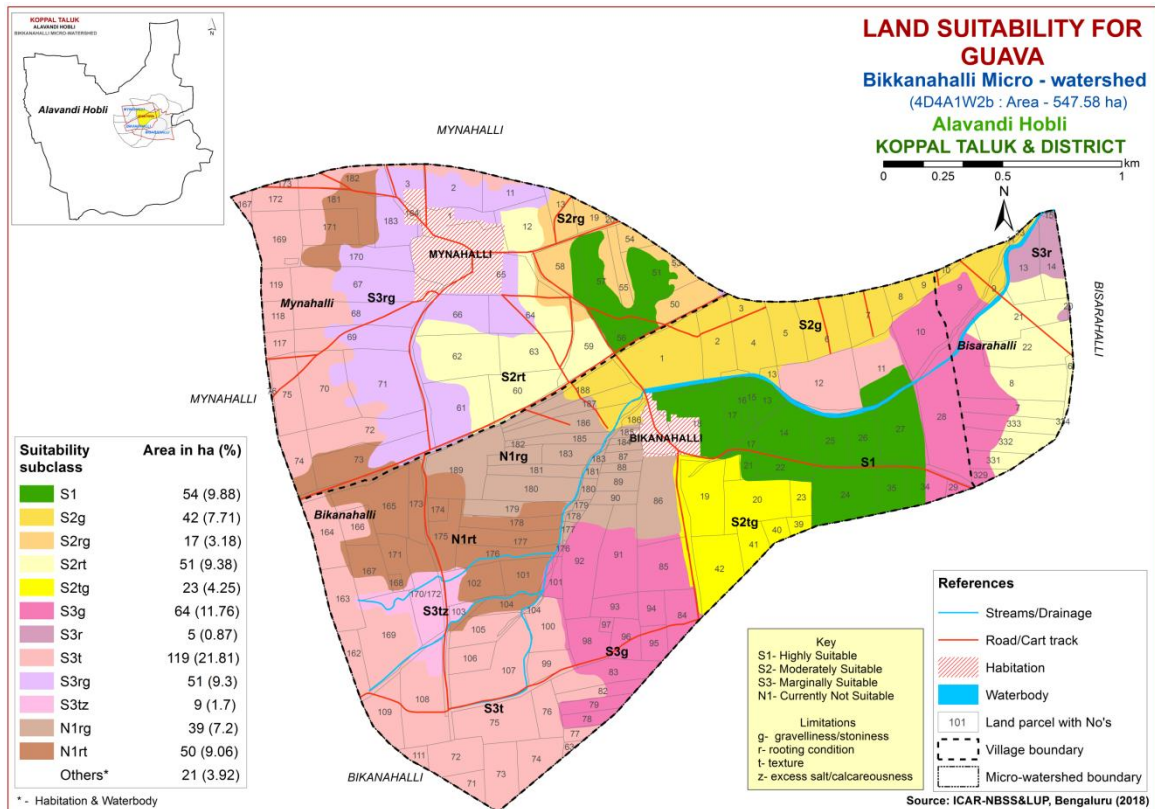


Fig. 7.16 Land Suitability map of Guava

7.17 Land suitability for Sapota (*Manilkara zapota*)

Sapota is one of the most important fruit crop grown in an area of about 29373 ha in almost all the districts of the state. The crop requirements (Table 7.18) for growing sapota were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing sapota was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.17.

Highly suitable (Class S1) lands for growing Sapota occupy an area of about 54 ha (10%) and are distributed in the northeastern and eastern part of the microwatershed. An area of about 135 ha (24%) is moderately suitable (Class S2) for Sapota and are distributed in the northern and eastern part of the microwatershed. They have minor limitations of rooting depth and gravelliness. Maximum area of about 248 ha (46%) is marginally suitable lands (Class S3) for growing Sapota and are distributed in all part of the microwatershed with major limitations of rooting depth, texture, calcareousness and gravelliness. An area of about 89 ha (16%) is currently not suitable (Class N1) for growing Sapota and are distributed in the northern, central, southern and western part of the microwatershed with severe limitations of rooting depth, gravelliness and calcareousness.

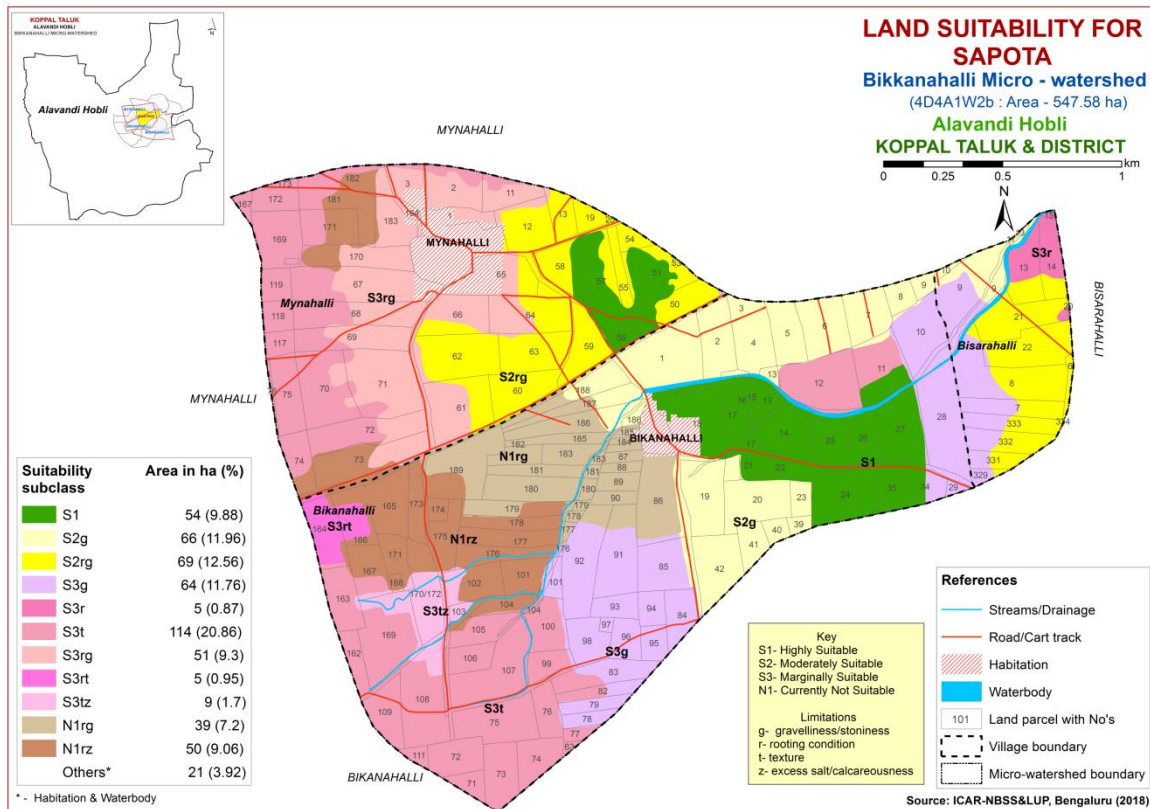


Fig. 7.17 Land Suitability map of Sapota

7.18 Land Suitability for Pomegranate (*Punica granatum*)

Pomegranate is one of the commercially grown fruit crop in about 18488 ha in Karnataka mainly in Bijapur, Bagalkot, Koppal, Gadag and Chitradurga districts. The crop requirements for growing pomegranate (Table 7.19) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing pomegranate was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.18.

Highly suitable (Class S1) lands for growing Pomegranate occupy an area of about 96 ha (18%) and are distributed in the northeastern and eastern part of the microwatershed. Maximum area of about 220 ha (40%) is moderately suitable (Class S2) for Pomegranate and are distributed in all part of the microwatershed. They have minor limitations of rooting depth, gravelliness and texture. An area of about 120 ha (22%) is marginally suitable lands (Class S3) for growing Pomegranate and are distributed in the northern, eastern and southern part of the microwatershed with major limitations of rooting depth and gravelliness. An area of about 89 ha (16%) is currently not suitable (Class N1) for growing Pomegranate and are distributed in the northern, southern and western part of the microwatershed with severe limitations of rooting depth, gravelliness and calcareousness.

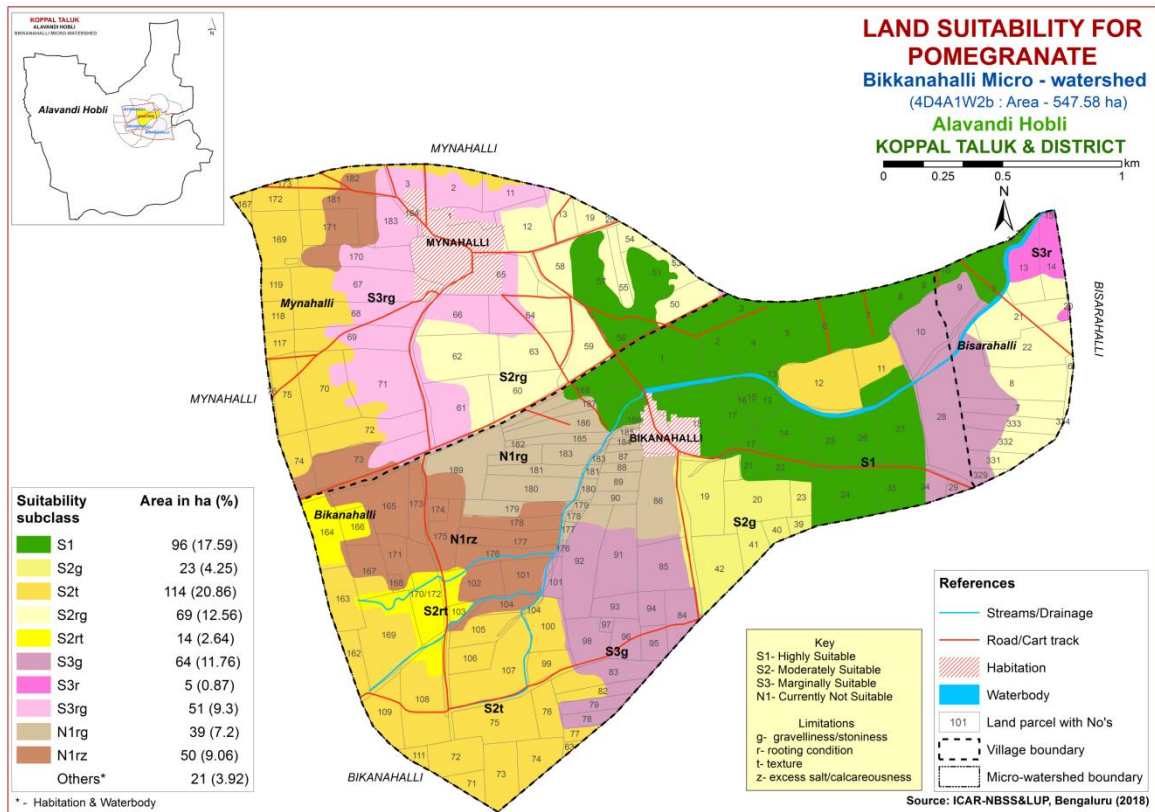


Fig. 7.18 Land Suitability map of Pomegranate

7.19 Land Suitability for Musambi (*Citrus limetta*)

Musambi is one of the most important fruit crop grown in an area of 5446 ha in almost all the districts of the state. The crop requirements (Table 7.20) for growing musambi were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing musambi was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.19.

Highly suitable (Class S1) lands for growing Musambi occupy a maximum area of about 168 ha (31%) and are distributed in all part of the microwatershed. An area of about 149 ha (28%) is moderately suitable (Class S2) for Musambi and are distributed in the northern, western and eastern part of the microwatershed. They have minor limitations of rooting depth, calcareousness and gravelliness. An area of about 120 ha (22%) is marginally suitable lands (Class S3) for growing Musambi and are distributed in the northern, eastern and southern part of the microwatershed with major limitations of rooting depth and gravelliness. An area of about 89 ha (16%) is currently not suitable (Class N1) for growing Musambi and are distributed in the northern, southern and western part of the microwatershed with severe limitations of rooting depth, gravelliness and calcareousness.

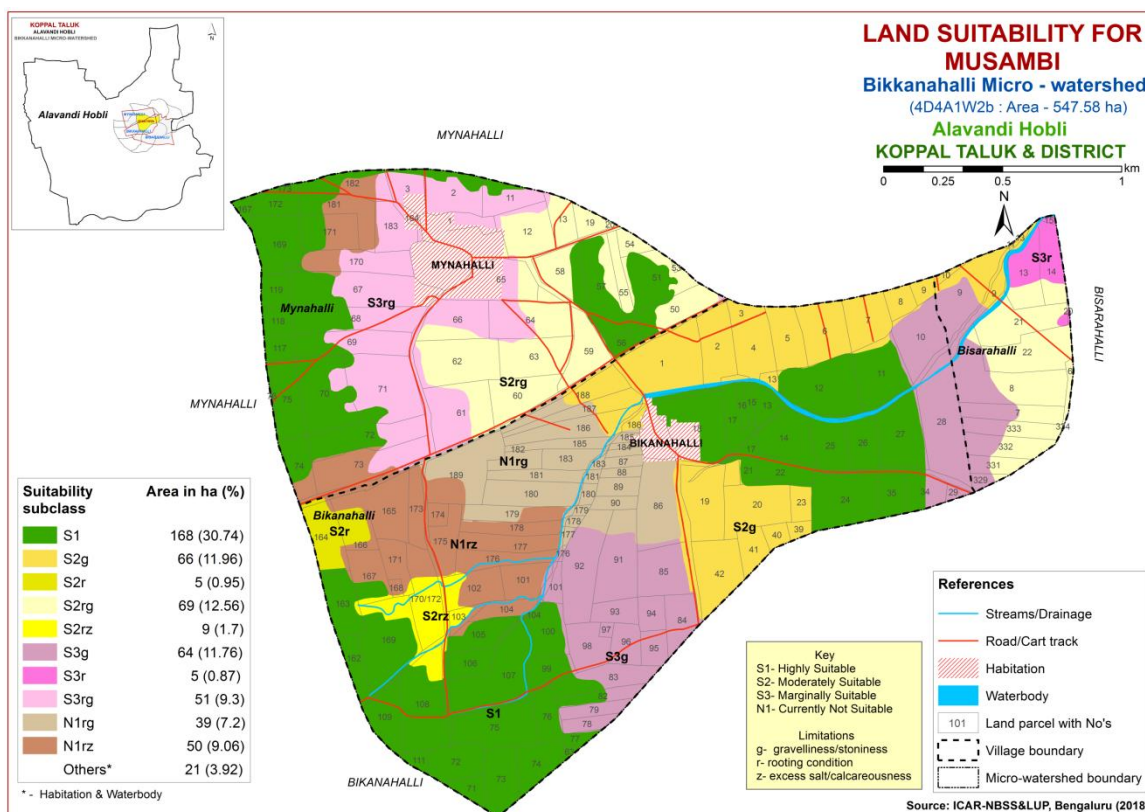


Fig. 7.19 Land Suitability map of Musambi

7.20 Land Suitability for Lime (*Citrus sp*)

Lime is one of the most important fruit crop grown in an area of 11752 ha in almost all the districts of the State. The crop requirements for growing lime (Table 7.21) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing lime was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.20.

Highly suitable (Class S1) lands for growing Lime occupy a maximum area of about 168 ha (31%) and are distributed in all part of the microwatershed. An area of about 149 ha (28%) is moderately suitable (Class S2) for Lime and are distributed in the northern, western and eastern part of the microwatershed. They have minor limitations of rooting depth, calcareousness and gravelliness. An area of about 120 ha (22%) is marginally suitable lands (Class S3) for growing Lime and are distributed in the northern, eastern and southern part of the microwatershed with major limitations of rooting depth and gravelliness. An area of about 89 ha (16%) is currently not suitable (Class N1) for growing Lime and are distributed in the northern, southern and western part of the microwatershed with severe limitations of rooting depth, gravelliness and calcareousness.

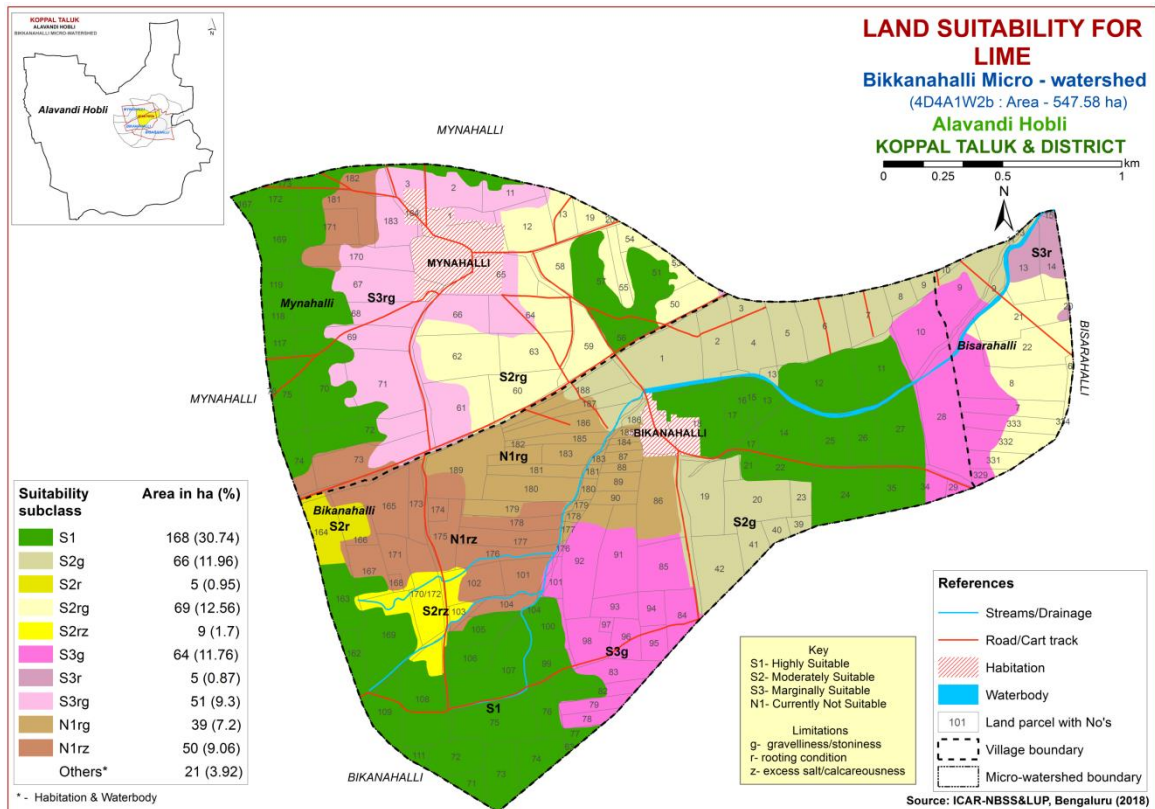


Fig. 7.20 Land Suitability map of Lime

7.21 Land Suitability for Amla (*Phyllanthus emblica*)

Amla is one of the most important fruit and medicinal crop grown in an area of 151 ha and distributed in almost all the districts of the state. The crop requirements (Table 7.22) for growing amla were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing amla was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.21.

An area of about 148 ha (27%) is highly suitable (Class S1) for growing Amla and are distributed in the northern and eastern part of the microwatershed. Moderately suitable (Class S2) lands cover a maximum area of about 289 ha (53%) and occur in all part of the microwatershed. They have minor limitations of rooting depth, gravelliness, texture and calcareousness. An area of about 89 ha (16%) is marginally suitable lands (Class S3) for growing Amla and are distributed in the northern, central and western part of the microwatershed with major limitations of rooting depth, calcareousness, texture and gravelliness.

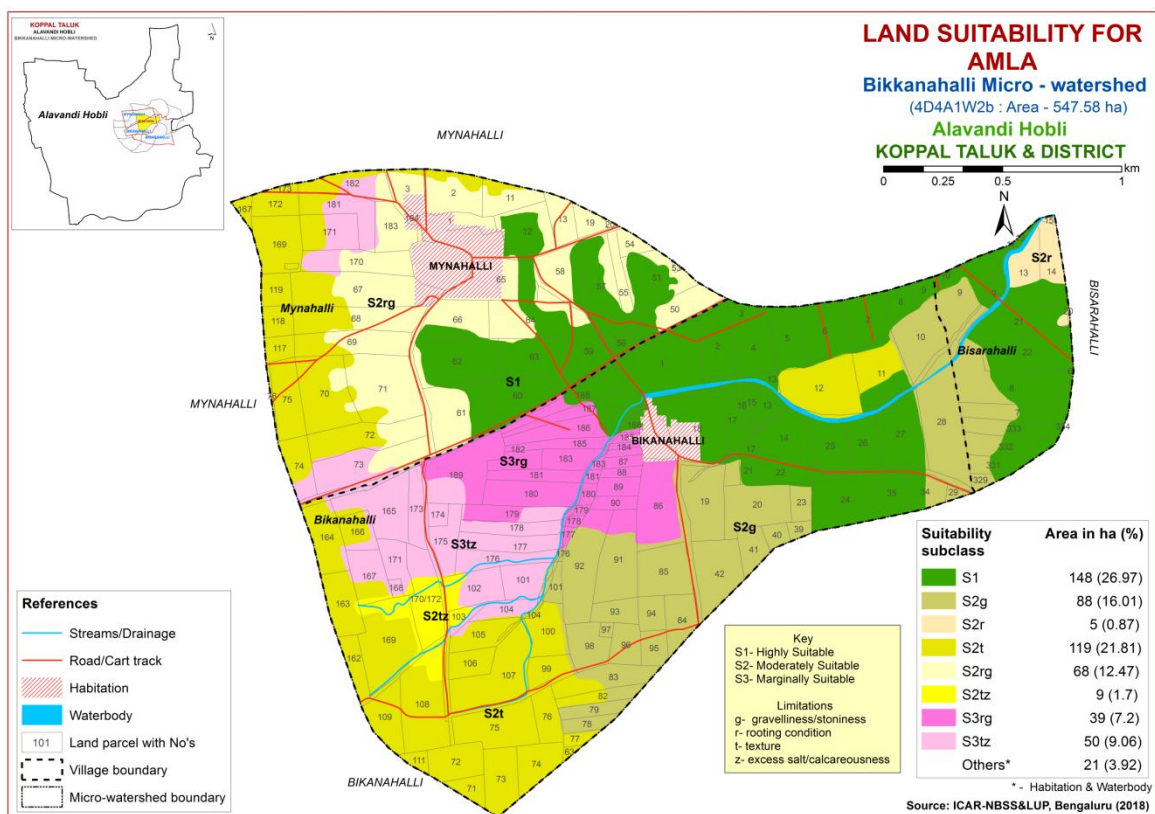


Fig. 7.21 Land Suitability map of Amla

7.22 Land Suitability for Cashew (*Anacardium occidentale*)

Cashew is one of the most important nut crop grown in an area of 7052 ha in almost all the districts of the State. The crop requirements for growing cashew (Table 7.23) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing cashew was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.22.

An area of about 96 ha (18%) is highly suitable (Class S1) for growing cashew and are distributed in the northeastern and eastern part of the microwatershed. An area of about 94 ha (17%) is moderately suitable (Class S2) and occur in the northern, eastern and southeastern part of the microwatershed. They have minor limitations of gravelliness, texture and rooting depth. An area of about 117 ha (21%) is marginally suitable (Class S3) for growing cashew and are distributed in the northern, eastern and southern part of the microwatershed with moderate limitations of gravelliness and rooting depth. Maximum area of about 217 ha (40%) is currently not suitable (Class N1) for growing cashew and distributed in all part of the microwatershed with severe limitations of texture, rooting depth, gravelliness and calcareousness.

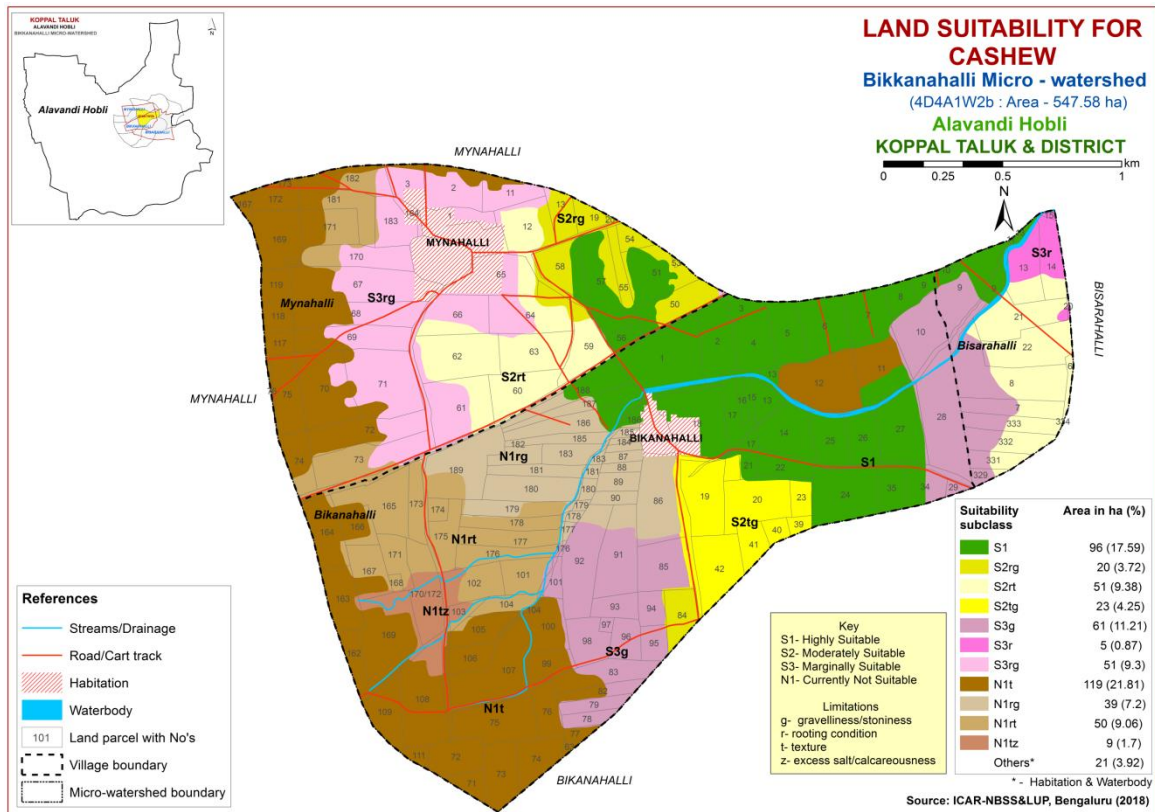


Fig. 7.22 Land Suitability map of Cashew

7.23 Land Suitability for Jackfruit (*Artocarpus heterophyllus*)

Jackfruit is one of the most important fruit crop grown in 5368 ha in all the districts of the state. The crop requirements (Table.7.24) for growing jackfruit were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing jackfruit was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in figure 7.23.

Highly suitable (Class S1) lands for growing Jackfruit occupy an area of about 54 ha (10%) and are distributed in the northeastern and eastern part of the microwatershed. An area of about 135 ha (24%) is moderately suitable (Class S2) for Jackfruit and are distributed in the northern and eastern part of the microwatershed. They have minor limitations of rooting depth and gravelliness. Maximum area of about 248 ha (46%) is marginally suitable lands (Class S3) for growing Jackfruit and are distributed in all part of the microwatershed with major limitations of rooting depth, texture, calcareousness and gravelliness. An area of about 89 ha (16%) is currently not suitable (Class N1) for growing Jackfruit and are distributed in the northern, central, southern and western part of the microwatershed with severe limitations of rooting depth, gravelliness and texture.

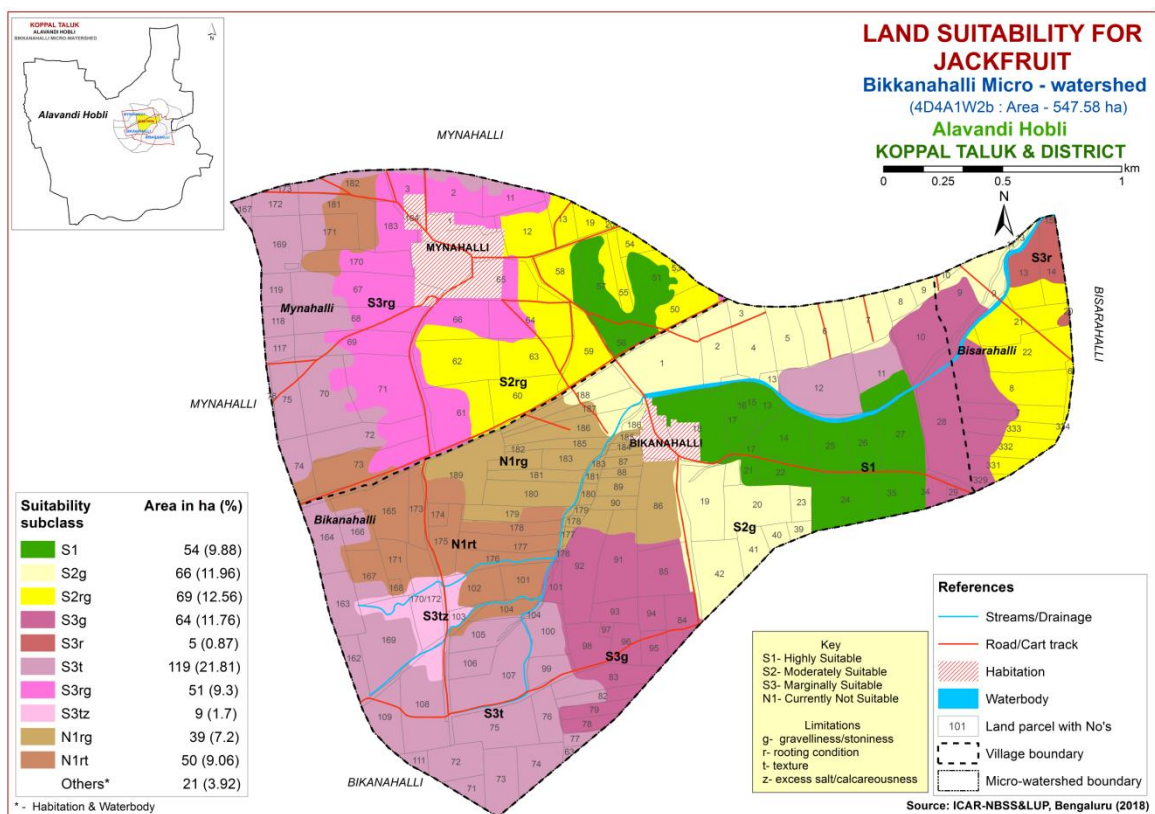


Fig. 7.23 Land Suitability map of Jackfruit

7.24 Land Suitability for Jamun (*Syzygium cumini*)

Jamun is an important fruit crop grown in almost all the districts of the state. The crop requirements (Table 7.25) for growing custard apple were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing custard apple was generated .The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.24.

Highly suitable (Class S1) lands for growing Jamun occupy an area of about 12 ha (2%) and are distributed in the northeastern part of the microwatershed. Maximum area of about 290 ha (52%) is moderately suitable (Class S2) for Jamun and are distributed in all part of the microwatershed. They have minor limitations of rooting depth, texture and gravelliness. An area of about 134 ha (25%) is marginally suitable lands (Class S3) for growing Jamun and are distributed in the northern, eastern, western and southern part of the microwatershed with major limitations of rooting depth, texture, calcareousness and gravelliness. An area of about 89 ha (16%) is currently not suitable (Class N1) for growing Jamun and are distributed in the northern, southern and western part of the microwatershed with severe limitations of rooting depth, gravelliness and texture.

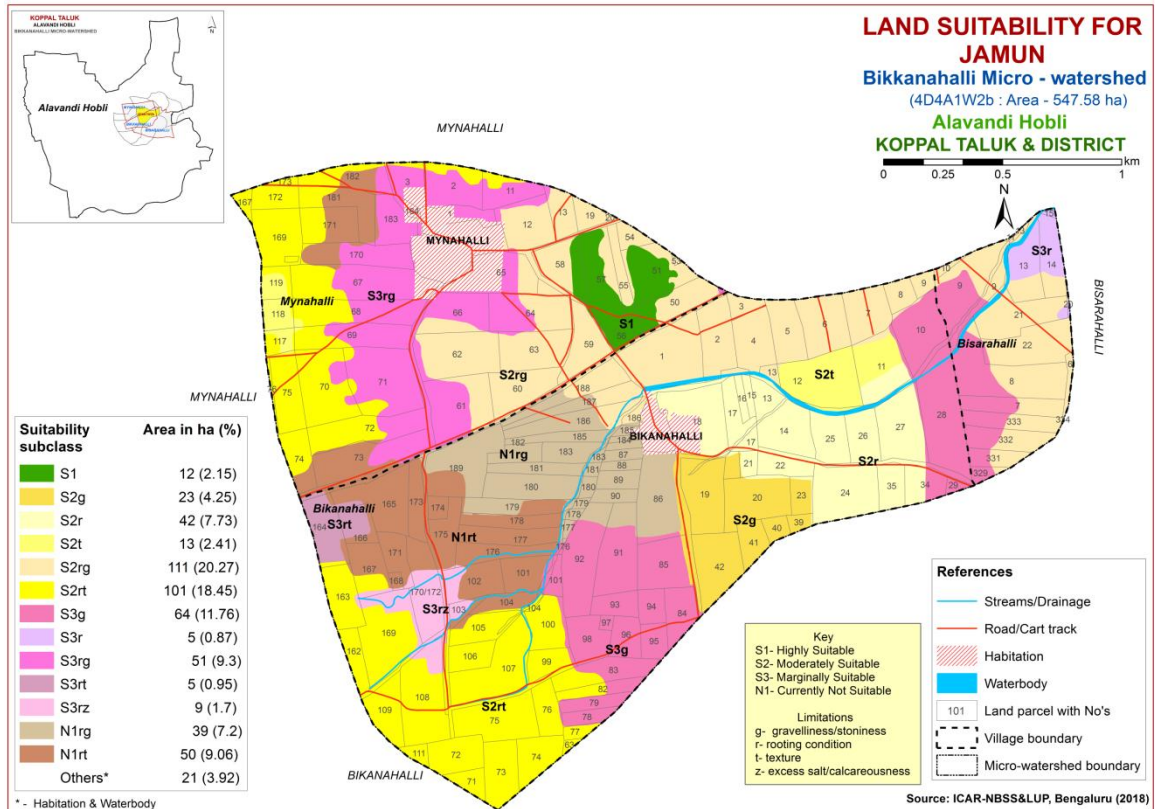


Fig. 7.24 Land Suitability map of Jamun

7.25 Land Suitability for Custard Apple (*Annona reticulata*)

Custard apple is one of the most important fruit crop grown in 1426 ha in almost all the districts of the State. The crop requirements (Table 7.26) for growing custard apple were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing custard apple was generated .The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.25.

Maximum area of about 267 ha (49%) is highly suitable (Class S1) for growing custard apple and are distributed in all part of the microwatershed. Moderately suitable (Class S2) lands cover an area of about 170 ha (31%) and occur in the northern, southern and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness, and calcareousness. An area of about 89 ha (16%) is marginally suitable lands (Class S3) for growing custard apple and are distributed in the northern, central, western and southern part of the microwatershed with major limitations of rooting depth, calcareousness and gravelliness.

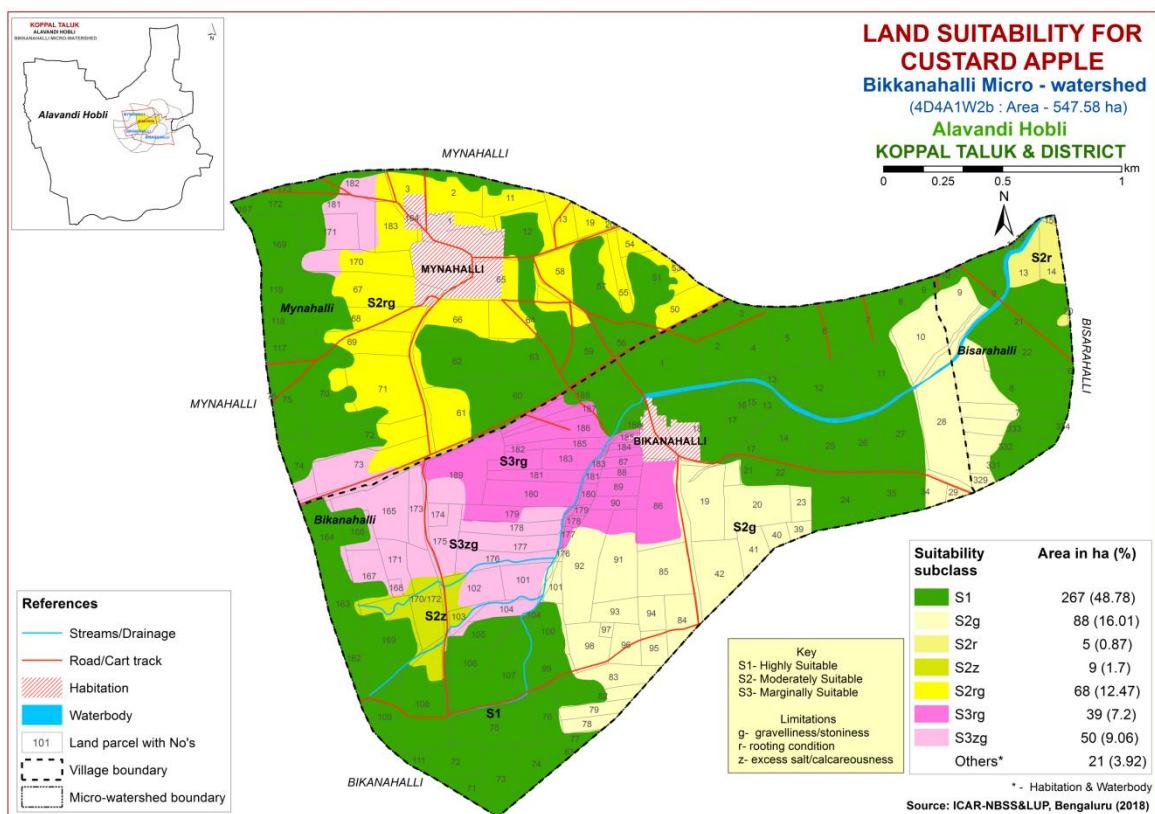


Fig. 7.25 Land Suitability map of Custard Apple

7.26 Land Suitability for Tamarind (*Tamarindus indica*)

Tamarind is one of the most important spice crop grown in 14897 ha in all the districts of the state. The crop requirements (Table 7.27) for growing tamarind were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing tamarind was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.26.

Highly suitable (Class S1) lands for growing Tamarind occupy an area of about 12 ha (2%) and are distributed in the northern part of the microwatershed. Maximum area of about 221 ha (41%) is moderately suitable (Class S2) for Tamarind and are distributed in all part of the microwatershed. They have minor limitations of rooting depth, texture and gravelliness. An area of about 148 ha (27%) is marginally suitable lands (Class S3) for growing Tamarind and are distributed in the northern, eastern, western and southern part of the microwatershed with major limitations of rooting and gravelliness. An area of about 145 ha (26%) is currently not suitable (Class N1) for growing Tamarind and are distributed in the northern, southern, central and western part of the microwatershed with severe limitations of rooting depth, gravelliness and calcareousness.

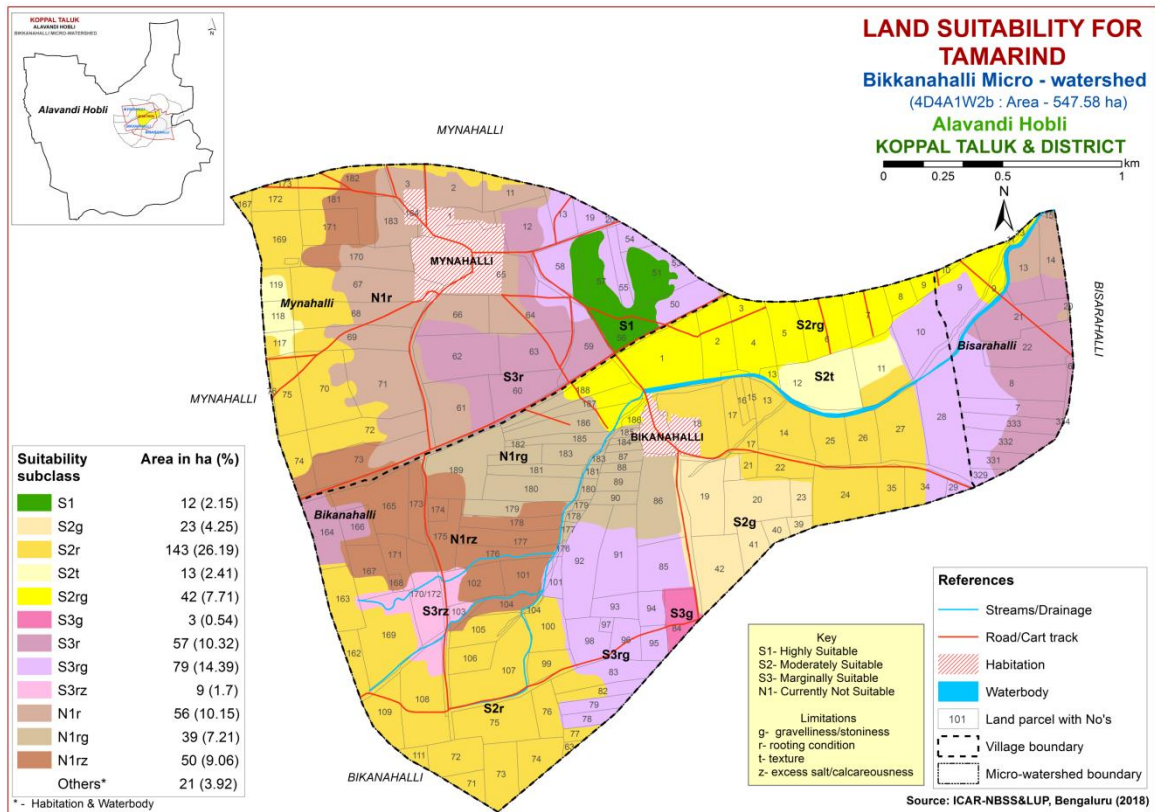


Fig. 7.26 Land Suitability map of Tamarind

7.27 Land Suitability for Mulberry (*Morus nigra*)

Mulberry is the most important leaf crop grown for rearing silkworms in about 1.66 lakh ha in all the districts of the state. The crop requirements for growing mulberry (Table 7.28) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing mulberry was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.27.

Highly suitable (Class S1) lands for growing Mulberry occupy an area of about 96 ha (18%) and are distributed in the northeastern and eastern part of the microwatershed. Maximum area of about 281 ha (51%) is moderately suitable (Class S2) for Mulberry and are distributed in all part of the microwatershed. They have minor limitations of rooting depth, gravelliness, drainage, calcareousness and texture. An area of about 59 ha (11%) is marginally suitable lands (Class S3) for growing Mulberry and are distributed in the northern and eastern part of the microwatershed with major limitations of rooting depth, texture and gravelliness. An area of about 89 ha (16%) is currently not suitable (Class N1) for growing Mulberry and are distributed in the northern, southern and western part of the microwatershed with severe limitations of rooting depth, gravelliness and calcareousness.

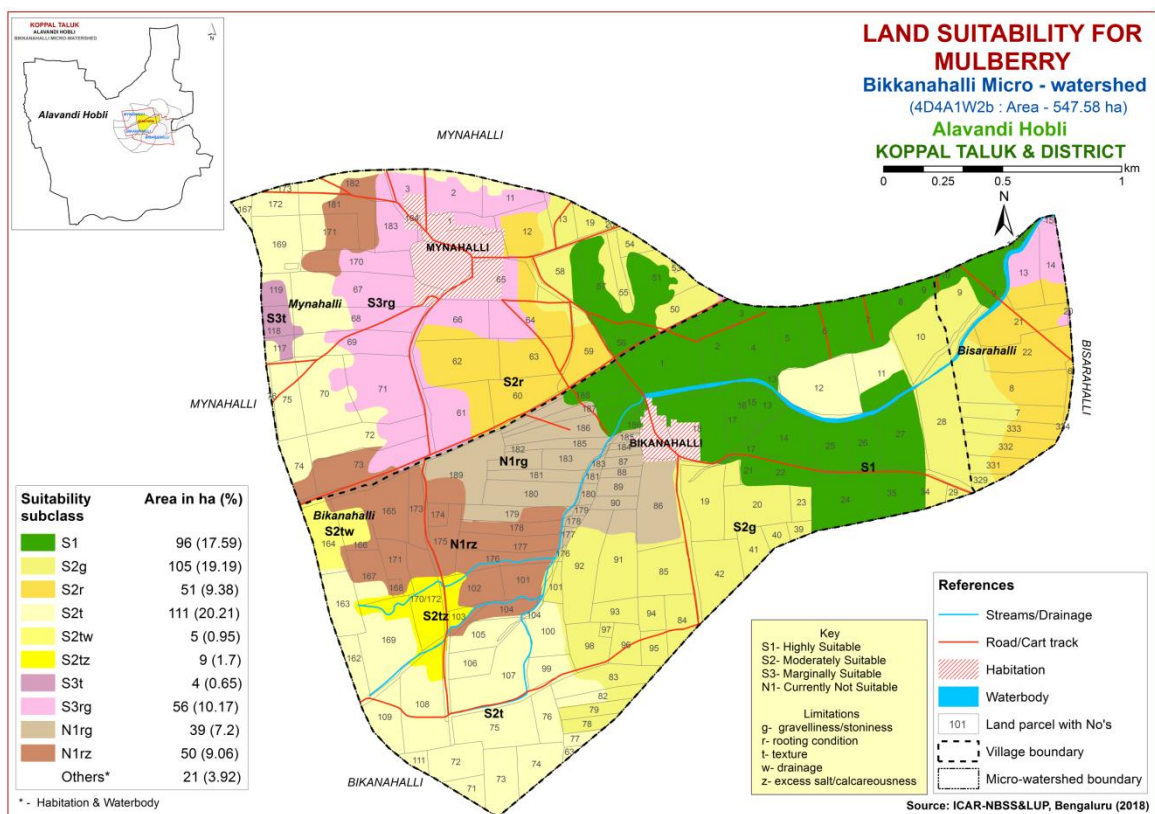


Fig. 7.27 Land Suitability map of Mulberry

7.28 Land Suitability for Marigold (*Tagetes erecta*)

Marigold is one of the most important flower crop grown in an area of 9108 ha in almost all the districts of the state. The crop requirements (Table 7.29) for growing marigold were matched with the soil-site characteristics and a land suitability map for growing marigold was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.28.

An area of about 54 ha (10%) is highly suitable (Class S1) for growing marigold and are distributed in the northern and eastern part of the microwatershed. Maximum area of about 301 ha (55%) is moderately suitable (Class S2) and occur in the major part of the microwatershed. They have minor limitations of gravelliness, rooting depth, drainage, texture and calcareousness. An area of about 171 ha (31%) is marginally suitable (Class S3) for growing marigold and are distributed in the northern, western, central, southern and eastern part of the microwatershed with moderate limitations of rooting depth, calcareousness and gravelliness.

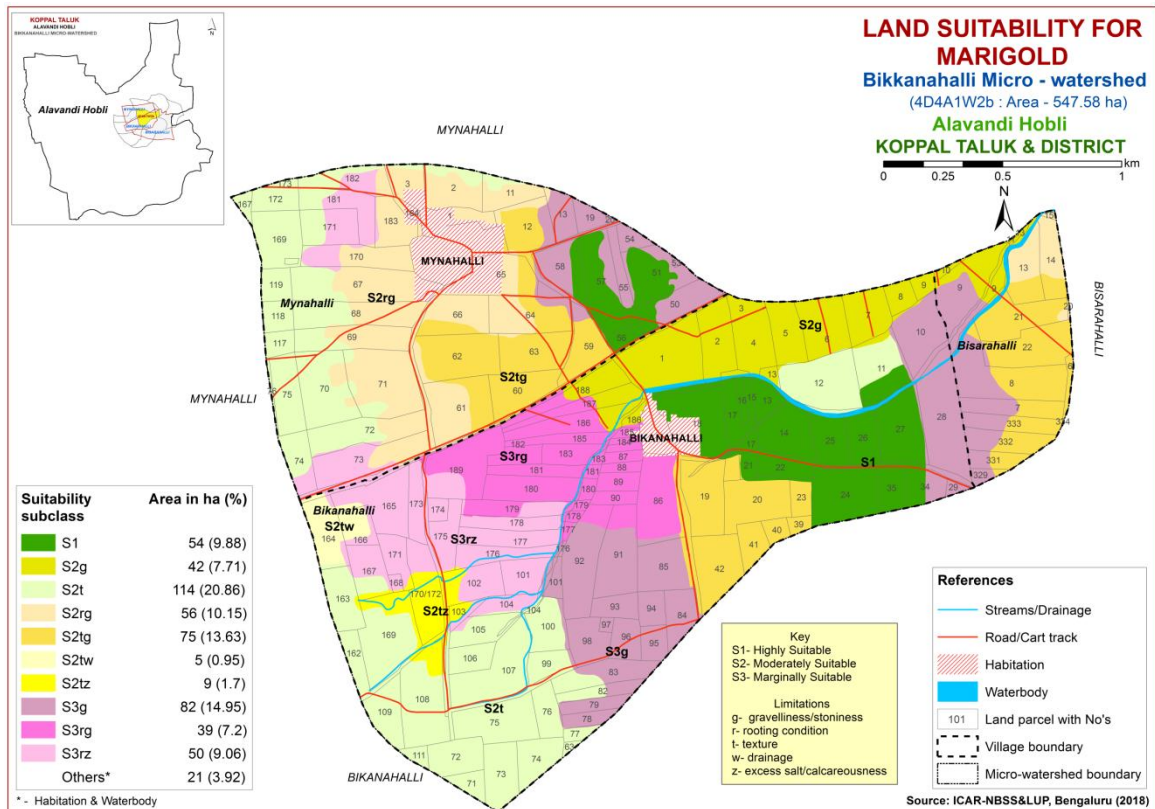


Fig. 7.28 Land Suitability map of Marigold

7.29 Land Suitability for Chrysanthemum (*Chrysanthemum indicum*)

Chrysanthemum is one of the most important flower crop grown in an area of 4978 ha in almost all the districts of the State. The crop requirements (Table 7.30) for growing chrysanthemum were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing chrysanthemum was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed is given in Figure 7.29.

An area of about 54 ha (10%) is highly suitable (Class S1) for growing chrysanthemum and are distributed in the northern and eastern part of the microwatershed. Maximum area of about 301 ha (55%) is moderately suitable (Class S2) and occur in the major part of the microwatershed. They have minor limitations of gravelliness, rooting depth, drainage, texture and calcareousness. An area of about 171 ha (31%) is marginally suitable (Class S3) for growing chrysanthemum and are distributed in the northern, western, central, southern and eastern part of the microwatershed with moderate limitations of rooting depth, calcareousness and gravelliness.

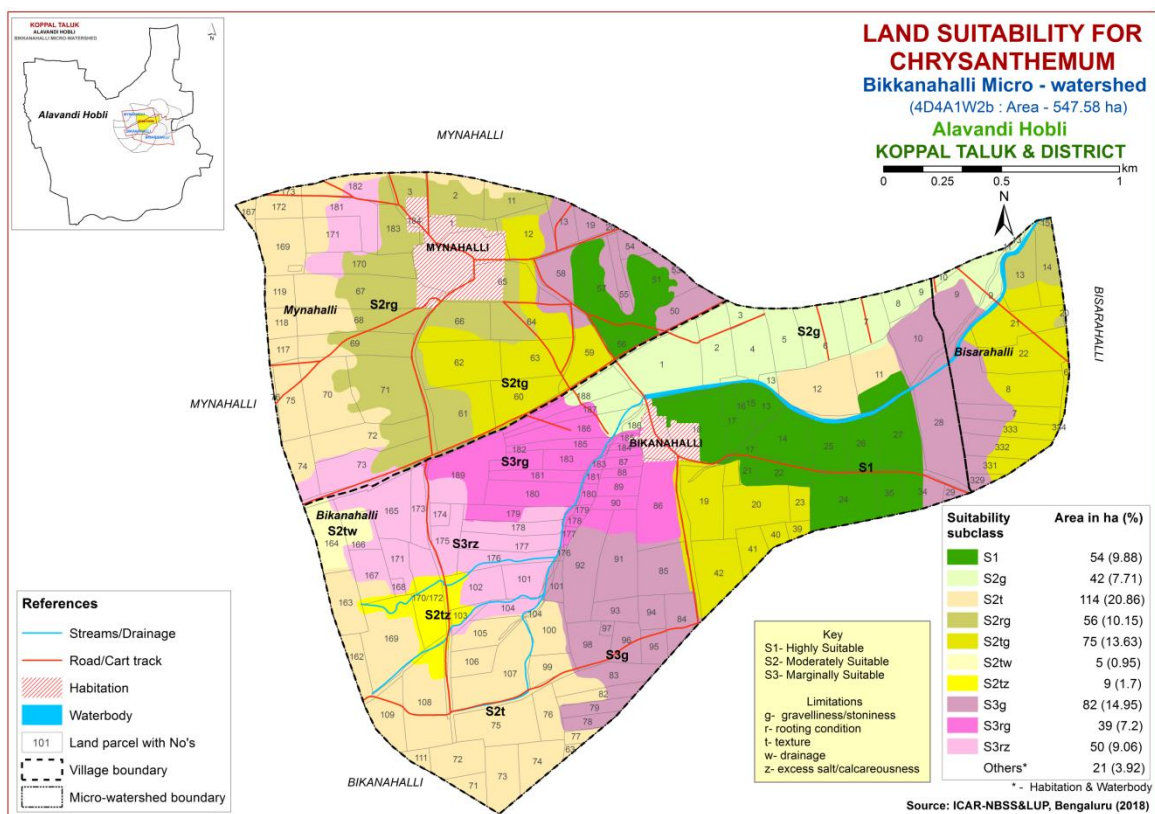


Fig. 7.29 Land Suitability map of Chrysanthemum

7. 30 Land Suitability for Jasmine (*Jasminum sp.*)

Jasmine is one of the most important flower crop grown in an area of 803 ha in almost all the districts of the State. The crop requirements (Table 7.31) for growing jasmine were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing jasmine was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.30.

An area of about 54 ha (10%) is highly suitable (Class S1) for growing jasmine and are distributed in the northern and eastern part of the microwatershed. An area of about 173 ha (31%) is moderately suitable (Class S2) and occur in the northern and eastern part of the microwatershed. They have minor limitations of gravelliness, rooting depth and texture. Maximum area of about 299 ha (55%) is marginally suitable (Class S3) for growing jasmine and are distributed in the major part of the microwatershed with moderate limitations of gravelliness, texture, drainage, rooting depth and calcareousness.

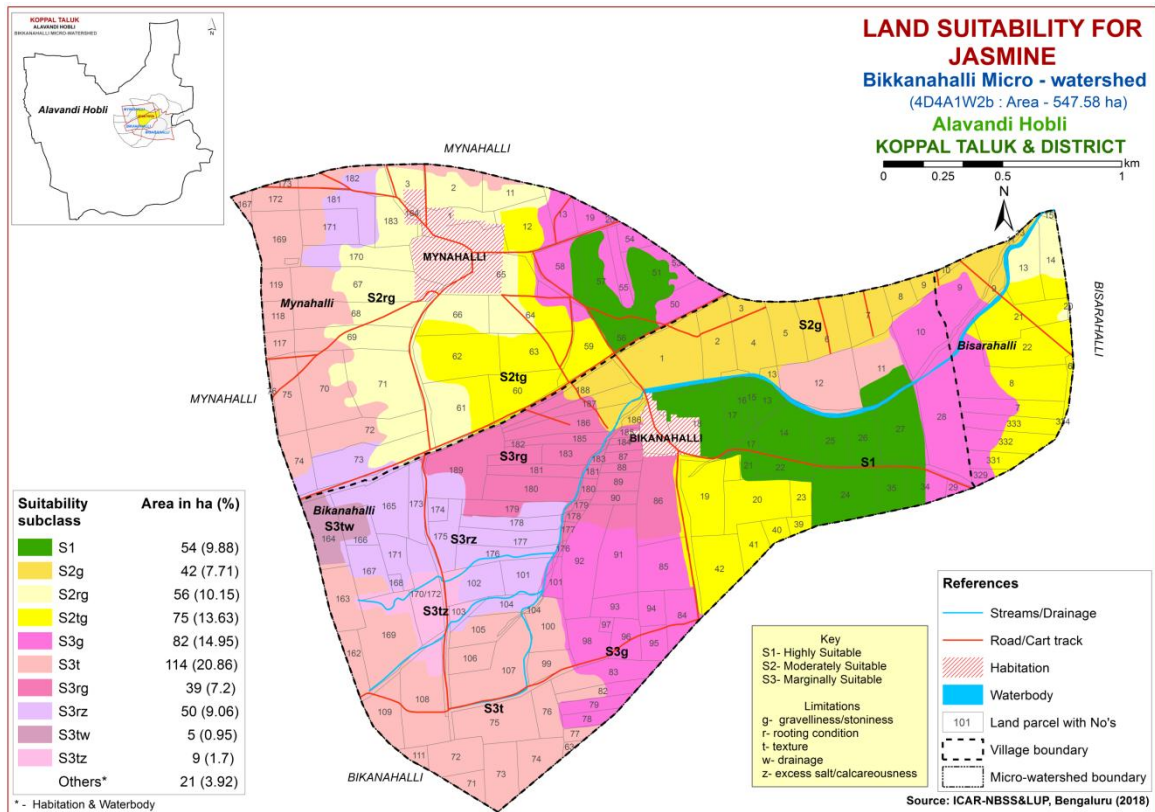


Fig. 7.30 Land Suitability map of Jasmine

7. 31 Land Suitability for Crossandra (*Crossandra infundibuliformis*)

Crossandra is one of the most important flower crop grown in almost all the districts of the State (Table 7.32). Land suitability map for growing crossandra was generated (Table 7.1). The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.31.

An area of about 54 ha (10%) is highly suitable (Class S1) for growing crossandra and are distributed in the northern and eastern part of the microwatershed. An area of about 195 ha (36%) is moderately suitable (Class S2) and occur in the northern, southern and eastern part of the microwatershed. They have minor limitations of gravelliness, rooting depth, texture and calcareousness. Maximum area of about 277 ha (50%) is marginally suitable (Class S3) for growing crossandra and are distributed in the major part of the microwatershed with moderate limitations of gravelliness, calcareousness, rooting depth and texture.

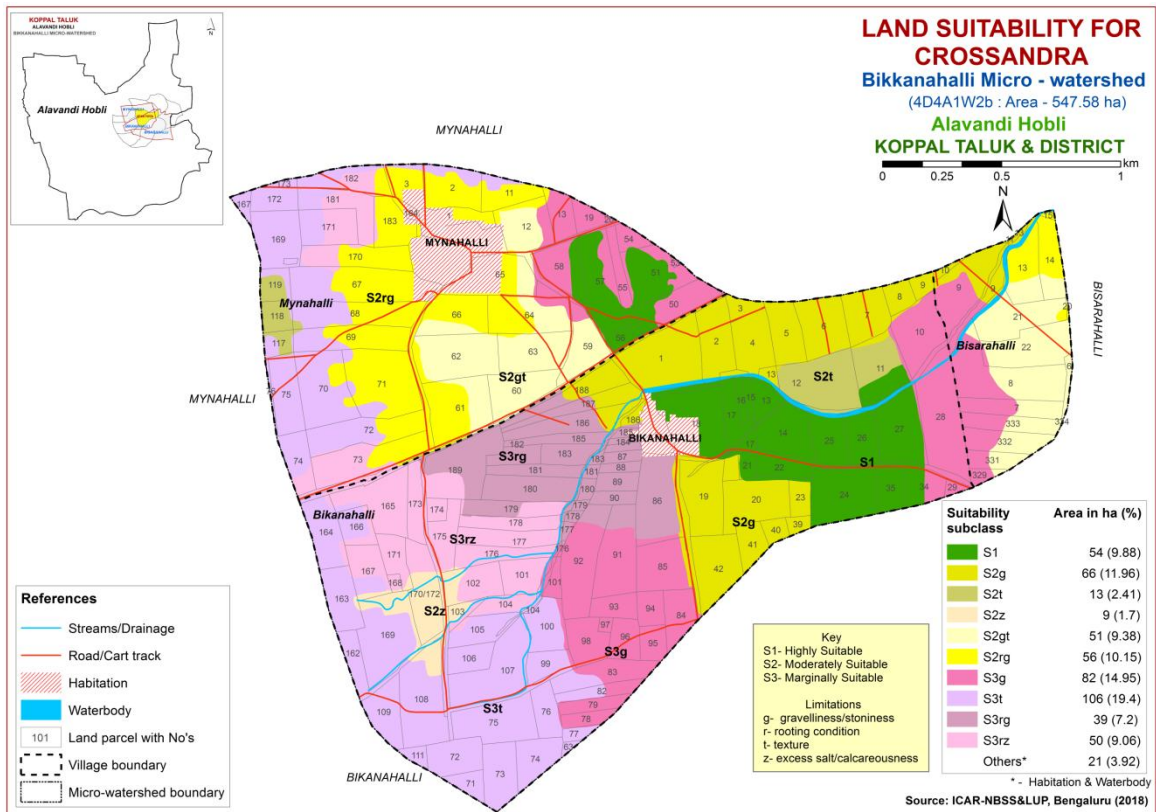


Fig. 7.31 Land Suitability map of Crossandra

Table 7.1 Soil-Site Characteristics of Bikkannahalli Microwatershed

| Soil Map Units | Climate (P) (mm) | Growing period (Days) | Drainage Class | Soil depth (cm) | Soil texture | | Gravelliness | | AWC (mm/m) | Slope (%) | Erosion | pH | EC (dSm ⁻¹) | ESP | CEC [Cmol (p ⁺)kg ⁻¹] | BS (%) |
|----------------|------------------|-----------------------|----------------|-----------------|--------------|-------------|--------------|-------------|------------|-----------|----------|------|-------------------------|------|---|--------|
| | | | | | Surface | Sub-surface | Surface | Sub-surface | | | | | | | | |
| RTRiB2 | 662 | <90 | WD | >150 | sc | c | <15 | <15 | 100-150 | 1-3 | moderate | 5.08 | 0.03 | 2.06 | 9.21 | 50.50 |
| NDLiB1g1 | 662 | <90 | WD | >150 | sc | gsc | 15-35 | >35 | 51-100 | 1-3 | slight | 7.46 | 0.08 | 0.32 | 11.45 | 92.00 |
| KMHiA1 | 662 | <90 | WD | 100-150 | sc | sc | <15 | <15 | 101-150 | 0-1 | slight | 7.20 | 0.19 | 0.54 | 15.07 | 100 |
| KMHiB1 | 662 | <90 | WD | 100-150 | sc | sc | <15 | <15 | 101-150 | 1-3 | slight | 7.20 | 0.19 | 0.54 | 15.07 | 100 |
| KMHiB2g1 | 662 | <90 | WD | 100-150 | sc | sc | 15-35 | <15 | 101-150 | 1-3 | moderate | 7.20 | 0.19 | 0.54 | 15.07 | 100 |
| BPRhB1g1 | 662 | <90 | WD | 100-150 | scl | gsc-gc | 15-35 | >35 | 51-100 | 1-3 | slight | 6.64 | 0.03 | 0.51 | 5.45 | 63.48 |
| BPRiB1 | 662 | <90 | WD | 100-150 | sc | gsc-gc | <15 | >35 | 51-100 | 1-3 | slight | 6.64 | 0.03 | 0.51 | 5.45 | 63.48 |
| BPRiB1g1 | 662 | <90 | WD | 100-150 | sc | gsc-gc | 15-35 | >35 | 51-100 | 1-3 | slight | 6.64 | 0.03 | 0.51 | 5.45 | 63.48 |
| BSRiB1g1 | 662 | <90 | WD | 75-100 | sc | gsc | 15-35 | 15-35 | 51-100 | 1-3 | slight | 6.60 | 0.12 | 6.00 | 8.80 | 77.55 |
| BSRiB2g1 | 662 | <90 | WD | 75-100 | sc | gsc | 15-35 | 15-35 | 51-100 | 1-3 | moderate | 6.60 | 0.12 | 6.00 | 8.80 | 77.55 |
| HDHcB2g1 | 662 | <90 | WD | 75-100 | sl | gsc-gc | 15-35 | >35 | 51-100 | 1-3 | moderate | 6.54 | 0.07 | 7.11 | 3.84 | 84.7 |
| HDHiB2g1 | 662 | <90 | WD | 75-100 | sc | gsc-gc | 15-35 | >35 | 51-100 | 1-3 | moderate | 6.54 | 0.07 | 7.11 | 3.84 | 84.7 |
| BDGcB1g2 | 662 | <90 | WD | 75-100 | sl | gc | 35-60 | 35-60 | 51-100 | 1-3 | slight | 6.24 | 0.06 | 0.35 | 3.76 | 52.56 |
| LKRcB2g1 | 662 | <90 | WD | 50-75 | sl | gsc | 15-35 | 40-60 | <50 | 1-3 | moderate | 8.18 | 0.30 | 4.51 | 12.19 | 100 |
| MKHhB2g1 | 662 | <90 | WD | 50-75 | scl | gscl | 15-35 | >35 | <50 | 1-3 | moderate | 7.38 | 0.09 | 1.49 | 14.84 | 93 |
| MKHiB2g1 | 662 | <90 | WD | 50-75 | sc | gscl | 15-35 | >35 | <50 | 1-3 | moderate | 7.38 | 0.09 | 1.49 | 14.84 | 93 |
| KTPiB1g1 | 662 | <90 | WD | 50-75 | sc | scl | 15-35 | 15-35 | 51-100 | 1-3 | slight | 6.42 | 0.07 | 0.05 | 4.41 | 100 |
| HRViB1g2 | 662 | <90 | WD | 25-50 | sc | gscl | 35-60 | >35 | <50 | 1-3 | slight | 6.05 | 0.21 | 0.73 | 11.24 | 100 |
| HRViB2g1 | 662 | <90 | WD | 25-50 | sc | gscl | 15-35 | >35 | <50 | 1-3 | moderate | 6.05 | 0.21 | 0.73 | 11.24 | 100 |
| MTLmB2g1 | 662 | <90 | WD | 25-50 | c | gc | 15-35 | 15-35 | 51-100 | 1-3 | moderate | 8.27 | 0.20 | 0.70 | 37.00 | - |
| DRLmB2g1 | 662 | <90 | MWD | 75-100 | c | c | 15-35 | <15 | 151-200 | 1-3 | moderate | 8.78 | 0.42 | 5.62 | 49.70 | 100 |
| NSPmB2 | 662 | <90 | MWD | 75-100 | c | c | <15 | <15 | 101-150 | 1-3 | moderate | 9.16 | 0.61 | 8.60 | 51.00 | - |
| GRHmA1 | 662 | <90 | MWD | 100-150 | c | c | <15 | <15 | >200 | 1-3 | moderate | 9.08 | 0.23 | 7.11 | 63.21 | 100 |
| GRHmB2 | 662 | <90 | MWD | 100-150 | c | c | <15 | <15 | >200 | 1-3 | moderate | 9.08 | 0.23 | 7.11 | 63.21 | 100 |
| KDTmA1 | 662 | <90 | MWD | >150 | c | sc-c | <15 | <15 | >200 | 0-1 | slight | 6.95 | 0.17 | 0.65 | 12.10 | 100 |
| BDRmB2 | 662 | <90 | MWD | >150 | c | c | <15 | <15 | >200 | 1-3 | moderate | 8.73 | 0.20 | 4.37 | 40.56 | - |

Table 7.2 Land suitability criteria for Sorghum

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|------------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 26–30 | 30–34; 24–26 | 34–40; 20–24 | >40; <20 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | V.poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | sc, c (red), c (black) | scl, cl | ls, sl | - |
| | pH | 1:2.5 | 5.5-7.8 | 5.0-5.5 7.8-9.0 | >9.0 | - |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | 10-15 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2 | 2-4 | 4-8 | >8 |
| | Sodicity (ESP) | % | 5-10 | 10-15 | >15 | |
| Erosion hazard | Slope | % | 0-3 | 3-5 | 5-10 | >10 |

Table 7.3 Land suitability criteria for Maize

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|---------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 30-34 | 35-38 26-30 | 38-40 26-20 | |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | Very poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc | c (red), c (black) | ls, sl | - |
| | pH | 1:2.5 | 5.5-7.8 | 5.0-5.5 7.8-9.0 | >9.0 | - |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO3 in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2 | 2-4 | 4-8 | >8 |
| | Sodicity (ESP) | % | 5-10 | 10-15 | >15 | - |
| Erosion hazard | Slope | % | 0-3 | 3-5 | 5-10 | >10 |

Table 7.4 Land suitability criteria for Bajra

| Land use requirement | | Rating | | | | |
|------------------------------|---|----------------------|--------------------------|--------------------------|-------------------|---------------------|
| Soil –site characteristics | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) | |
| Climatic regime | Mean temperature in growing season | °C | 28-32 | 33-38 24-27 | 39-40 20-23 | <20 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | 500-750 | 400-500 | 200-400 | <200 |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | Very poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | sl, scl, cl,sc,c (red) | c (black) | ls | - |
| | pH | 1:2.5 | 6.0-7.8 | 5.0-5.5 7.8-9.0 | 5.5-6.0 >9.0 | |
| | CEC | C mol (p+)/ Kg | | | | |
| | BS | % | | | | |
| | CaCO3 in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | 15-35 | 35-60 | >60 | |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2 | 2-4 | 4-8 | >8 |
| | Sodicity (ESP) | % | 5-10 | 10-15 | >15 | |
| Erosion hazard | Slope | % | 1-3 | 3-5 | 5-10 | >10 |

Table 7.5 Land suitability criteria for Groundnut

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|---------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 24–33 | 22–24; 33–35 | 20–22; 35–40 | <20; >40 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Mod. Well drained | Poorly drained | Very Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl | sl,cl, sc | c (red), c (black), ls | - |
| | pH | 1:2.5 | 6.0-7.8 | 5.5-6.0 7.8-8.4 | 5.0-5.5 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <35 | 35-60 | >60 | |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2 | 2-4 | 4-8 | >8 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.6 Land suitability criteria for Sunflower

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|---------------------------|--------------------------|--------------------------|------------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 24–30 | 30–34; 20–24 | 34–38; 16–20 | >38; <16 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | mod. Well drained | - | Poorly to very drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | cl, sc,c (red), c (black) | scl | ls, sl | - |
| | pH | 1:2.5 | 6.5-7.8 | 7.8-8.4 5.5-6.5 | 8.4-9.0; 5.0-5.5 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO3 in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >100 | 75-100 | 50-75 | <50 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2 | 2-4 | 4-8 | >8 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.7 Land suitability criteria for Redgram

| Land use requirement | | | Rating | | | |
|------------------------------|---|----------------|---|--|---|---------------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 30-35(G) 20-25(AV) 15-18 (F&PS) 35-40(M) | 25-30(G) 20-25 (AV) 12-15 (F&PS) 30-35(M) | 20-25(G) 15-20(AV) 10-12 (F&PS) 25-30(M) | < 20 <15 <10 <25 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Mod. Well drained | Poorly drained | Very Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | sc, c (red) | c (black),sl, scl, cl | ls | - |
| | pH | 1:2.5 | 6.0-7.8 | 5.5-6.0 7.8-9.0 | 5.0-5.5 >9.0 | - |
| | CEC | C mol (p+)/ Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >100 | 75-100 | 50-75 | <50 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-50 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <1.0 | 1.0-2.0 | >2.0 | |
| | Sodicity (ESP) | % | 5-10 | 10-15 | >15 | |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.8 Land suitability criteria for Bengal gram

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|---------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 20–25 | 25–30; 15–20 | 30–35; 10–15 | >35; <10 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Mod. Well drained | Poorly drained | Very Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | c(black) | - | c (red), scl, cl, sc | ls, sl |
| | pH | 1:2.5 | 6.0-7.8 | 5.0-6.0 7.8-9.0 | >9.0 | - |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2 | 2-4 | 4-8 | >8 |
| | Sodicity (ESP) | % | 5-10 | 10-15 | >15 | - |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.9 Land suitability criteria for Cotton

| Land use requirement | | | Rating | | | |
|------------------------------|---|--------------|-------------------------|--|--------------------------|---------------------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 22-32 | >32 | <19 | - |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well to moderately well | Poorly drained/Some what excessively drained | - | very poorly/excessively drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | sc, c (red,black) | cl | scl | ls, sl |
| | pH | 1:2.5 | 6.5-7.8 | 7.8-8.4 | 5.5-6.5 8.4->9.0 | <5.5 |
| | CEC | C mol (p+)Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >100 | 50-100 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2 | 2-4 | 4-8 | >8 |
| | Sodicity (ESP) | % | 5-10 | 10-15 | >15 | |
| Erosion hazard | Slope | % | <3 | 3-5 | - | >5 |

Table 7.10 Land suitability criteria for Chilli

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|---------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 25-32 | 33-35 20-25 | 35-38 <20 | >38 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | Very poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc | c (black), sl | ls | - |
| | pH | 1:2.5 | 6.0-7.3 | 5.0-6.0 7.3-8.4 | 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2 | 2-4 | 4-8 | >8 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.11 Land suitability criteria for Tomato

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|--------------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 25-28 | 29-32 20-24 | 15-19 33-36 | <15 >36 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | V.poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | sl, scl, cl, sc, c (red) | - | ls, c(black) | - |
| | pH | 1:2.5 | 6.0-7.3 | 5.0-6.0 7.3-8.4 | 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.12 Land suitability criteria for Brinjal

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|-------------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | Well drained | Moderately well drained | Poorly drained | V. Poorly drained |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | | | | |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | sl, scl, cl, sc c (red) | - | ls, c (black) | - |
| | pH | 1:2.5 | 6.0-7.3 | 7.3-8.4 5.0-6.0 | 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | >60 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.13 Land suitability criteria for Onion

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|----------------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 20-30 | 30-35 | 35-40 | >40 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately /imperfectly | - | Poorly to V poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | sl,scl,cl,sc,c (red) | - | c (Black),ls | - |
| | pH | 1:2.5 | 6.0-7.3 | 5.0-6.0 7.3-7.8 | 7.8-8.4 | >8.4 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO3 in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <1.0 | 1.0-2.0 | 2.0-4.0 | <4 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.14 Land suitability criteria for Bhendi

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|-------------------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 25-28 | 29-32 20-24 | 15-19 33-36 | <15 >36 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Imperfectly drained | Poorly to very poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl,sc, c (red) | c (black) | ls | - |
| | pH | 1:2.5 | 6.0-7.3 | 5.0-6.0 7.3-8.4 | 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.15 Land suitability criteria for Drumstick

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | | | | |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | V.Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | sc, scl, cl, c (red) | sl, c (black) | ls | s |
| | pH | 1:2.5 | 6.0-7.3 | 5.0-5.5 7.3-7.8 | 5.5-6.0 7.8-8.4 | >8.4 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >100 | 75-100 | 50-75 | <50 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <35 | 35-60 | 60-80 | >80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | | | | |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-10 | - | >10 |

Table 7.16 Land suitability criteria for Mango

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 28-32 | 24-27 33-35 | 36-40 | 20-24 |
| | Min temp. before flowering | °C | 10-15 | 15-22 | >22 | - |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | Days | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | V. Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc, c (red) | - | ls, sl, c (black) | - |
| | pH | 1:2.5 | 5.5-7.3 | 5.0-5.5 7.3-8.4 | 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >150 | 100-150 | 75-100 | <75 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.17 Land suitability criteria for Guava

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 28-32 | 33-36 24-27 | 37-42 20-23 | |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | V.Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc, c (red) | sl | c (black), ls | - |
| | pH | 1:2.5 | 6.0-7.8 | 5.0-6.0 | 7.8-8.4 | >8.4 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >100 | 75-100 | 50-75 | <50 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.18 Land suitability criteria for Sapota

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|------------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 28-32 | 33-36 24-27 | 37-42 20-23 | >42 <18 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | - | Poorly to very drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc, c (red) | sl | ls, c (black) | - |
| | pH | 1:2.5 | 6.0-7.3 | 5.0-6.0 7.3-8.4 | 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO3 in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >100 | 75-100 | 50-75 | <50 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.19 Land suitability criteria for Pomegranate

| Land use requirement | | | Rating | | | |
|------------------------------|---|----------------|----------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 30-34 | 35-38 25-29 | 39-40 15-24 | |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | V.Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl,cl, sc, c (red) | c (black),sl | ls | - |
| | pH | 1:2.5 | 5.5-7.8 | 7.8-8.4 | 5.0-5.5 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/ Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >100 | 75-100 | 50-75 | <50 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.20 Land suitability criteria for Musambi

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 28-30 | 31-35 24-27 | 36-40 20-23 | >40 <20 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately drained | poorly | Very poorly |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc, c | sl | ls | - |
| | pH | 1:2.5 | 6.0-7.8 | 5.5-6.0 7.8-8.4 | 5.0-5.5 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >100 | 75-100 | 50-75 | <50 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.21 Land suitability criteria for Lime

| Land use requirement | | Rating | | | | |
|------------------------------|---|----------------------|--------------------------|--------------------------|--------------------|-------------|
| Soil –site characteristics | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) | |
| Climatic regime | Mean temperature in growing season | °C | 28-30 | 31-35 24-27 | 36-40 20-23 | >40 <20 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately drained | poorly | Very poorly |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc, c | sl | ls | - |
| | pH | 1:2.5 | 6.0-7.8 | 5.5-6.0 7.8-8.4 | 5.0-5.5 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >100 | 75-100 | 50-75 | <50 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.22 Land suitability criteria for Amla

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | | | | |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Mod. well drained | Poorly drained | V. Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc, c (red) | c (black) | ls, sl | - |
| | pH | 1:2.5 | 5.5-7.3 | 5.0-5.5 7.3-7.8 | 7.8-8.4 | >8.4 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15-35 | 35-60 | 60-80 | - |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | 0-3 | 3-5 | 5-10 | >10 |

Table 7.23 Land suitability criteria for Cashew

| Land use requirement | | | Rating | | | |
|------------------------------|---|----------------|----------------------|--------------------------|--------------------------|---------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 32 to 34 | 28 to 32; 34 to 38 | 24 to 28; 38 to 40 | <20; >40 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | moderately well drained | Poorly drained | Very poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc, c (red) | - | sl, ls | c (black) |
| | pH | 1:2.5 | 5.5-6.5 | 5.0-5.5 6.5-7.3 | 7.3-7.8 | >7.8 |
| | CEC | C mol (p+)/ Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >100 | 75-100 | 50-75 | <50 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2 | 2-4 | 4-8 | >8 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | <3 | 3-10 | >10 | - |

Table 7.24 Land suitability criteria for Jackfruit

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | | | | |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Mod. well | Poorly | V. Poorly |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc, c (red) | - | sl, ls, c (black) | - |
| | pH | 1:2.5 | 5.5-7.3 | 5.0-5.5 7.3-7.8 | 7.8-8.4 | >8.4 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >100 | 75-100 | 50-75 | <50 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | >60 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | 0-3 | 3-5 | 5-10 | >10- |

Table 7.25 Land suitability criteria for Jamun

| Land use requirement | | Rating | | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | | | | |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well | Mod. well | Poorly | V.Poorly |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc, c(red) | sl, c (black) | ls | - |
| | pH | 1:2.5 | 6.0-7.8 | 5.0-6.0 | 7.8-8.4 | >8.4 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >150 | 100-150 | 50-100 | <50 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | >60 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | 0-3 | 3-5 | 5-10 | >10 |

Table 7.26 Land suitability criteria for Custard apple

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|---------------------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | | | | |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Mod. well drained | Poorly drained | V.Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | Scl, cl, sc, c (red), c (black) | - | Sl, ls | - |
| | pH | 1:2.5 | 6.0-7.3 | 5.5-6.0 7.3-8.4 | 5.0-5.5 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15-35 | 35-60 | 60-80 | - |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | 0-3 | 3-5 | >5 | - |

Table 7.27 Land suitability criteria for Tamarind

| Land use requirement | | Rating | | | | |
|------------------------------|---|----------------------|--------------------------|--------------------------|-------------------|------------------|
| Soil –site characteristics | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) | |
| Climatic regime | Mean temperature in growing season | °C | | | | |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Mod.well drained | Poorly drained | V.Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl,sc, c (red) | sl, c (black) | ls | - |
| | pH | 1:2.5 | 6.0-7.3 | 5.0-6.0 7.3-7.8 | 7.8-8.4 | >8.4 |
| | CEC | C mol (p+)/ Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >150 | 100-150 | 75-100 | <75 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2 | 2-4 | 4-8 | >8 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | 0-3 | 3-5 | 5-10 | >10 |

Table 7.28 Land suitability criteria for Mulberry

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 24–28 | 22–24; 28–32 | 32–38; 22–18 | >38; <18 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | V. Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | sc, cl, scl | c (red) | c (black), sl, ls | - |
| | pH | 1:2.5 | 5.5-7.3 | 5.0-5.5 7.8-8.4 | 7.3-8.4 | >8.4 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO ₃ in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >100 | 75-100 | 50-75 | <50 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | 0-35 | 35-60 | 60-80 | >80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2 | 2-4 | 4-8 | >8 |
| | Sodicity (ESP) | % | <5 | 5-10 | 10-15 | >15 |
| Erosion hazard | Slope | % | 0-3 | 3-5 | 5-10 | >10 |

Table 7.29 Land suitability criteria for Marigold

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|-------------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 18-23 | 17-15 24-35 | 35-40 10-14 | >40 <10 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | V.Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | sl,scl, cl, sc, c (red) | c (black) | ls | - |
| | pH | 1:2.5 | 6.0-7.3 | 5.0-6.0 7.3-8.4 | 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO3 in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | | | | |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.30 Land suitability criteria for Chrysanthemum

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|-------------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 18-23 | 17-15 24-35 | 35-40 10-14 | >40 <10 |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. temp. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | V.Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | sl,scl, cl, sc, c (red) | c (black) | ls | - |
| | pH | 1:2.5 | 6.0-7.3 | 5.0-6.0 7.3-8.4 | 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO3 in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | ds/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | | | | |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

Table 7.31 Land suitability criteria for Jasmine (irrigated)

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|-------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | 18-23 | 17-15 24-35 | 35-40 10-14 | - |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | V.Poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc, c (red) | sl | ls, c (black) | - |
| | pH | 1:2.5 | 6.0-7.3 | 5.0-6.0 7.3-8.4 | 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO3 in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | dS/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | | | | |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

7.32 Land suitability criteria for Crossandra

| Land use requirement | | | Rating | | | |
|------------------------------|---|---------------|----------------------|--------------------------|--------------------------|-------------------------------|
| Soil –site characteristics | | Unit | Highly suitable (S1) | Moderately suitable (S2) | Marginally suitable (S3) | Not suitable (N1) |
| Climatic regime | Mean temperature in growing season | °C | | | | |
| | Mean max. temp. in growing season | °C | | | | |
| | Mean min. tempt. in growing season | °C | | | | |
| | Mean RH in growing season | % | | | | |
| | Total rainfall | mm | | | | |
| | Rainfall in growing season | mm | | | | |
| Land quality | Soil-site characteristic | | | | | |
| Moisture availability | Length of growing period for short duration | Days | | | | |
| | Length of growing period for long duration | | | | | |
| | AWC | mm/m | | | | |
| Oxygen availability to roots | Soil drainage | Class | Well drained | Moderately well drained | - | Poorly to very poorly drained |
| | Water logging in growing season | Days | | | | |
| Nutrient availability | Texture | Class | scl, cl, sc, c(red) | sl, | c (black),ls | - |
| | pH | 1:2.5 | 6.0-7.3 | 5.0-6.0 7.3-8.4 | 8.4-9.0 | >9.0 |
| | CEC | C mol (p+)/Kg | | | | |
| | BS | % | | | | |
| | CaCO3 in root zone | % | | <5 | 5-10 | >10 |
| | OC | % | | | | |
| Rooting conditions | Effective soil depth | cm | >75 | 50-75 | 25-50 | <25 |
| | Stoniness | % | | | | |
| | Coarse fragments | Vol % | <15 | 15-35 | 35-60 | 60-80 |
| Soil toxicity | Salinity (EC saturation extract) | dS/m | <2.0 | 2-4 | 4-8 | >8.0 |
| | Sodicity (ESP) | % | | | | |
| Erosion hazard | Slope | % | <3 | 3-5 | 5-10 | >10 |

7.32 Land Management Units (LMUs)

The 26 soil map units identified in Bikkanaahalli microwatershed have been grouped into 8 Land Management Units (LMUs) for the purpose of preparing a Proposed Crop Plan. Land Management Units are grouped based on the similarities in respect of the type of soil, the depth of the soil, the surface soil texture, gravel content, AWC, slope, erosion etc. and a Land Use Classes map (Fig.7.31) has been generated. These Land Use Classes are expected to behave similarly for a given level of management.

The map units that have been grouped into 8 Land Management Units along with brief description of soil and site characteristics are given below.

| LMU | Mapping unit | Soil and site characteristics |
|-----|--|---|
| 1 | 288.RTRiB2 | Very deep (>150 cm), red clayey soils, slope (1-3%), moderate erosion |
| 2 | 199.KMHiA1 200.KMHiB1 202.KMHiB2g1 165.BSRiB1g1 168.BSRiB2g1 | Moderately deep to deep (75-150 cm), clayey soils, slope (0-3%), slight to moderate erosion, gravelly (15-35%) |
| 3 | 299.NDLiB1g1 229.BPRhB1g1 237.BPRiB1 238.BPRiB1g1 111.HDHcB2g1 128.HDHiB2g1 181.BDGcB1g2 | Moderately deep to very deep (75 to >150 cm), red gravelly sandy loam to clay soils, slope (1-3%), slight to moderate erosion, gravel to very gravel (15-60%) |
| 4 | 403.KDTmA1 433.BDRmB2 370.GRHmA1 373.GRHmB2 351.DRLmB2g1 362.NSPmB2 | Moderately deep to very deep (75 to >150 cm), black calcareous clayey soils, slope (0-3%), slight to moderate erosion, gravelly (15-35%) |
| 5 | 43.LKRcB2g1 85.MKHhB2g1 90.MKHiB2g1 | Moderately shallow (50-75 cm), red gravelly sandy clay to sandy clay loam soils, slope (1-3%), moderate erosion, gravelly (15-35%) |
| 6 | 74.KTPiB1g1 | Moderately shallow (50-75 cm), red clayey soil, slope (1-3%), slight erosion, gravelly (15-35%) |
| 7 | 311.MTLmB2g1 | Shallow (25-50 cm), black calcareous clay soils, slope (1-3%), moderate erosion, gravelly (15-35%) |
| 8 | 30.HRViB1g2 31.HRViB2g1 | Shallow (25-50 cm), red gravelly clayey soils, slope (1-3%), slight to moderate erosion, gravel to very gravelly (15-60%) |

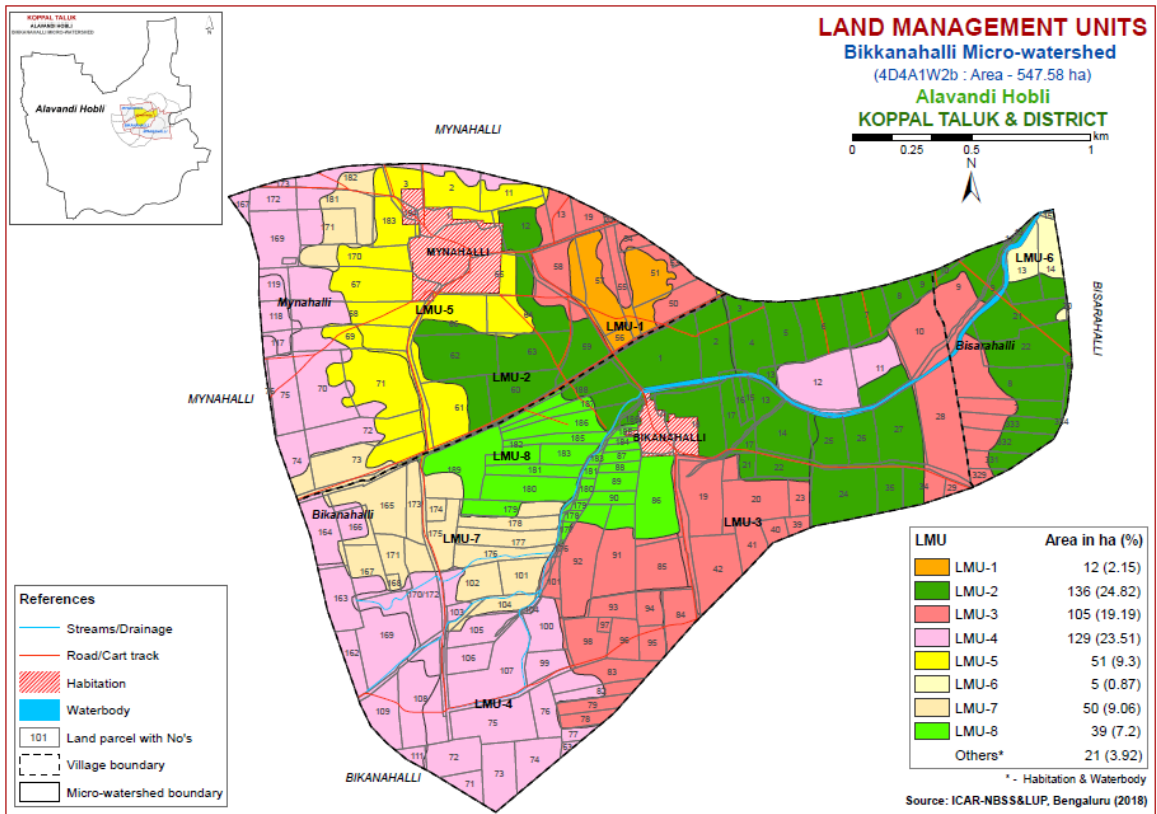


Fig 7.32 Land Management Units map of Bikkanahalli microwatershed

7.33 Proposed Crop Plan for Bikkanahalli Microwatershed

After assessing the land suitability for the 31 crops, the proposed crop plan has been prepared for the 8 identified LMUs by considering only the highly (Class S1) and moderately (Class S2) suitable lands for each of the 31 crops. The resultant proposed crop plan is presented in Table 7.33.

Table 7.33 Proposed Crop Plan for Bikkanahalli Microwatershed

| LMU | Soil Map Units | Survey Number | Soil and site characteristics | Field Crops | Horticulture Crops | Suitable Interventions |
|-----|--|---|--|--|---|---|
| 1 | 288.RTRiB2 | Mynahalli : 51,56,57 | Very deep (>150cm), red clayey soils, slope (1-3%), moderate erosion | Maize, Finger millet, Sorghum, Sunflower, Redgram, Cowpea, Field bean, Castor | Fruit crops: Mango, Pomegranate, Guava, Sapota, Jackfruit, Tamarind, Lime, Musambi, Amla, Custard apple, Cashew Vegetable crops: Drumstick, Tomato, Chilli, Brinjal, Curry leaves Flower crops: Marigold, Chrysanthemum, Jasmine | Drip irrigation, mulching, suitable soil and water conservation practises (Crescent Bunding with Catch Pit etc) |
| 2 | 199.KMHiA1 200.KMHiB1 202.KMHiB2g1 165.BSRiB1g1 168.BSRiB2g1 | Bikkanahalli: 1,2,3,4,5,6,7,8,9,13,14,15,16,17,18,21,22,24,25,26,27,34,35,188 Bisarahalli: 6,8,10,11,21,22,331,332,333,334 Mynahalli: 12,59,60,62,63 | Moderately deep to deep (75-100cm), clayey soils, slope (0-3%), slight to moderate erosion, gravelly (15-35%) | Maize, Sorghum, Sunflower, Bajra, Finger millet, Groundnut, Red gram, Cowpea, Field bean, Castor | Fruit crops: Pomegranate, Guava, Sapota, Jackfruit, Tamarind, Lime, Musambi, Amla, Custard apple Vegetable crops: Drumstick, Tomato, Chilli, Brinjal, Onion, Curry leaves Flower crops: Marigold, Chrysanthemum, Jasmine | Drip irrigation, mulching, suitable soil and water conservation practises (Crescent Bunding with Catch Pit etc) |
| 3 | 299.NDLiB1g1 229.BPRhB1g1 237.BPRiB1 238.BPRiB1g1 111.HDHcB2g1 128.HDHiB2g1 181.BDGcB1g2 | Bikkanahalli: 10,19,20,23,28,29,39,40,41,42,78,79,83,84,85,91,92,93,94,95,96,97,98 Bisarahalli : 7,9,329 Mynahalli: 13,19,20,50,53,54, 55,58 | Moderately deep to very deep (75 to >150cm), red gravelly sandy loam to clay soils, slope (1-3%), slight to moderate erosion, gravel to very gravel (15-60%) | Sorghum, Groundnut, Redgram, Bajra, Horsegram, Castor | Fruit crops: Musambi, Lime, Jamun, Jackfruit Amla, Custard apple Vegetable crops: Drumstick, Curry leaves | Drip irrigation, mulching, suitable soil and water conservation practises (Crescent Bunding with Catch Pit etc) |
| 4 | 403.KDTmA1 | Bikkanahalli: 11,12,63,7 | Moderately deep to very | Maize, Sorghum, | Fruit crops: Sapota, | Application of FYM, |

| LMU | Soil Map Units | Survey Number | Soil and site characteristics | Field Crops | Horticulture Crops | Suitable Interventions |
|-----|--|---|---|---|--|--|
| | 433.BDRmB2 370.GRHmA1 373.GRHmB2 351.DRLmB2g1 362.NSPmB2 | 1,72,73,74,75,76,77,82, 99,100,103,105,106,107 ,108,109,111,162,163,1 64,166,169,170/172 Mynahalli: 70,72,74,75, 76,117,118,119,167,169 ,172,173,182 | deep (75 to >150cm), black calcareous clayey soils, slope (0-3%), slight to moderate erosion, gravelly (15-35%) | Bajra Sunflower, Cotton, Bengal gram, Safflower, Linseed, | Pomegranate, Jamun, Lime, Musambi, Tamarind, Amla, Custard apple Vegetables: Drumstick, Chilli, Coriander, Tomato, Bhendi Flowers: Marigold, Chrysanthemum | Biofertilizers and micronutrients, drip irrigation, mulching, suitable soil and water conservation practises |
| 5 | 43.LKRcB2g1 85.MKHhB2g1 90.MKHhB2g1 | Mynahalli:2,3,11,61,64, 66,67,68,69,71,170,183 | Moderately shallow (50- 75cm), red gravelly sandy clay to sandy clay loam soils, slope (1-3%), moderate erosion, gravelly (15-35%) | Sorghum, Groundnut, Bajra, Castor | Fruit crops: Lime, Musambi, Amla, Cashew, Custard apple, | Drip irrigation, mulching, suitable soil and water conservation practises (Crescent Bunding with Catch Pit etc) |
| 6 | 74.KTPiB1g1 | Bisarahalli: 13,14,15,20 | Moderately shallow (50- 75cm), red clayey soil, slope (1-3%), slight erosion, gravelly (15- 35%) | Sorghum, Groundnut, Bajra, Green gram, Black gram, Cowpea, Horse gram, Castor, | Fruit crops: Lime, Musambi, Amla, Custard apple, Cashew Flower crops: Marigold, Chrysanthemum | Drip irrigation, Mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc) |
| 7 | 311.MTLmB2g1 | Bikanahalli: 101,102,10 4,165,167,168,171,173, 174,175,176,177, 178 Mynahalli : 73,171,181 | Shallow (25-50cm), black calcareous clay soils, slope (1-3%), moderate erosion, gravelly (15- 35%) | Bengal gram, Horse gram, Coriander | Agri-Silvi-Pasture: Hybrid Napier, <i>Styloxanthes hamata</i> , <i>Styloxanthes scabra</i> | Sowing across the slope, drip irrigation and mulching is recommended |
| 8 | 30.HRViB1g2 31.HRViB2g1 | Bikanahalli: 86,87,88,8 9,90,179,180,181,182,1 83,184,185,186,187, 189 | Shallow (25-50cm), red gravelly clayey soils, slope (1-3%), slight to moderate erosion, gravel to very gravelly (15-60%) | Green gram, Black gram, Horse gram | Agri-Silvi-Pasture: Custard apple, Amla, Hybrid Napier, <i>Styloxanthes hamata</i> , <i>Glyricidia</i> , <i>Styloxanthes scabra</i> | Use of short duration varieties, sowing across the slope and split application of nitrogen fertilizers |

SOIL HEALTH MANAGEMENT

8.1 Soil Health

Soil health is basic to plant health and plant health is basic to human and bovine health. Soil is fundamental to crop production. Without soil, no food could be produced nor would livestock be fed on a large scale. Because it is finite and fragile, soil is a precious resource that requires special care from its users.

Soil health or the capacity of the soil to function is critical to human survival. Soil health has been defined as: “the capacity of the soil to function as a living system without adverse effect on the ecosystem”. Healthy soils maintain a diverse community of soil organisms that help to form beneficial symbiotic associations with plant roots, recycle essential plant nutrients, improve soil structure with positive repercussions for soil, water and nutrient holding capacity and ultimately improve crop production and also contribute to mitigating climate change by maintaining or increasing its carbon content.

Functional interactions of soil biota with organic and inorganic components, air and water determine a soil’s potential to store and release nutrients, and water to plants and to promote and sustain plant growth. Thus, maintaining soil health is vital to crop production and conserve soil resource base for sustaining agriculture.

The most important characteristics of a healthy soil are

- Good soil tilth
- Sufficient soil depth
- Good water storage and good drainage
- Adequate supply, but not excess of nutrients
- Large population of beneficial organisms
- Small proportion of plant pathogens and insect pests
- Low weed pressure
- Free of chemicals and toxins that may harm the crop
- Resistance to degradation
- Resilience when unfavourable conditions occur

Characteristics of Bikkannahalli Microwatershed

- ❖ The soil phases with sizeable area identified in the microwatershed belonged to the soil series of GRH 102 ha (19%), KMH 84 ha (15%), BPR 61 ha (11%), BSR 52 ha (9%), MKH 51 ha (9%), MTL 50 ha (9%), HRV 40 ha (7%), NDL 23 ha (4%), HDH 18 ha (3%), RTR 12 ha (2%), KDT 10 ha (2%), DRL 9 ha (2%), NSP 5 ha (1%), KTP 5 ha (1%), BDR 4 ha (1%), BDG 3 ha (1%) and LKR < 1 ha (<1%).
- ❖ As per land capability classification, entire area in the microwatershed falls under arable land category (Class II and III). The major limitations identified in the arable lands were soil and erosion.

- ❖ On the basis of soil reaction, an area of about 12 ha (2%) is slightly alkaline (pH 7.3-7.8), 238 ha (44 %) is moderately alkaline (pH 7.8-8.4), 120 ha (22%) is strongly alkaline (pH 8.4-9.0) and 156 ha (28%) is very strongly alkaline (pH >9.00) in reaction.

Soil Health Management

The following actions are required to improve the current land husbandry practices that provide a sound basis for the successful adoption of sustainable crop production system.

Alkaline soils

An area of about 526 ha (96%) is under alkaline soils. The following actions are recommended.

1. Regular addition of organic manure, green manuring, green leaf manuring, crop residue incorporation and mulching needs to be taken up to improve the soil organic matter status.
2. Application of biofertilizers (Azospirillum, Azatobacter, Rhizobium).
3. Application of 25% extra N and P (125 % RDN&P).
4. Application of ZnSO₄ – 12.5 kg/ha (once in three years).
5. Application of Boron – 5 kg/ha (once in three years).

Soil Degradation

Soil erosion is one of the major factors affecting the soil health in the microwatershed. An area of about 301 ha (55%) is under moderate erosion. The areas with moderate erosion need immediate soil and water conservation and, other land development and land husbandry practices for restoring soil health.

Dissemination of Information and Communication of Benefits

Any large scale implementation of soil health management requires that supporting information is made available widely, particularly through channels familiar to farmers and extension workers. Given the very high priority attached to soil health especially by the Central Government on issuing Soil-Health Cards to all the farmers, media outlets like Regional, State and National Newspapers, Radio and Dooradarshan programs in local languages but also modern information and communication technologies such as Cellular phones and the Internet, which can be much more effective in reaching the younger farmers.

Inputs for Net Planning (Saturation Plan) and Interventions needed

Net planning in IWMP is focusing on preparation of

1. Soil and Water Conservation Treatment Plans for each plot or farm.
2. Productivity enhancement measures/ interventions for existing crops/livestock/other farm enterprises.
3. Diversification of farming mainly with perennial horticultural crops and livestock.
4. Improving livelihood opportunities and income generating activities.

In this connection, how various outputs of Sujala-III are of use in addressing these objectives of Net Planning are briefly presented below.

- ❖ **Soil Depth:** The depth of a soil decides the amount of moisture and nutrients it can hold, what crops can be taken up or not, depending on the rooting depth and the length of growing period available for raising any crop. Deeper the soil, better for a wide variety of crops. If sufficient depth is not available for growing deep rooted crops, either choose medium or short duration crops or deeper planting pits need to be opened and additional good quality soil brought from outside has to be filled into the planting pits.
- ❖ **Surface Soil Texture:** Lighter soil texture in the top soil means, better rain water infiltration, less run-off and soil moisture conservation, less capillary rise and less evaporation losses. Lighter surface textured soils are amenable to good soil tilth and are highly suitable for crops like groundnut, root vegetables (carrot, raddish, potato etc) but not ideal for crops that need stagnant water like lowland paddy. Heavy textured soils are poor in water infiltration and percolation. They are prone for sheet erosion; such soils can be improved by sand mulching. The technology that is developed by the AICRP-Dryland Agriculture, Vijayapura, Karnataka can be adopted.
- ❖ **Gravelliness:** More gravel content is favorable for run-off harvesting but poor in soil moisture storage and nutrient availability. It is a significant parameter that decides the kind of crop to be raised.
- ❖ **Land Capability Classification:** The land capability map shows the areas suitable and not suitable for agriculture and the major constraints in each of the plot/survey number. Hence, one can decide what kind of enterprise is possible in each of these units. In general, erosion and soil are the major constraints in Bikkanahalli Microwatershed.
- ❖ **Organic Carbon:** An area of about 265 ha (48%) is low (<0.5%), 260 ha (48%) is medium (0.5-0.75%) and 1 ha (<1%) is high (>0.75) in OC content. The areas that are low and medium in OC needs to be further improved by applying farmyard manure and rotating crops with cereals and legumes or mixed cropping.
- ❖ **Promoting green manuring:** Growing of green manuring crops costs Rs. 1250/ha (green manuring seeds) and about Rs. 2000/ha towards cultivation that totals to Rs. 3250/- per ha. On the other hand, application of organic manure @ 10 tons/ha costs Rs. 5000/ha. The practice needs to be continued for 2-3 years or more. Nitrogen fertilizer needs to be supplemented by 25% in addition to the recommended level in 525 ha area where OC is less than 0.75 per cent. For example, for rainfed maize, recommended level is 50 kg N per ha and an additional 12 kg /ha needs to be applied for all the crops grown in these plots.

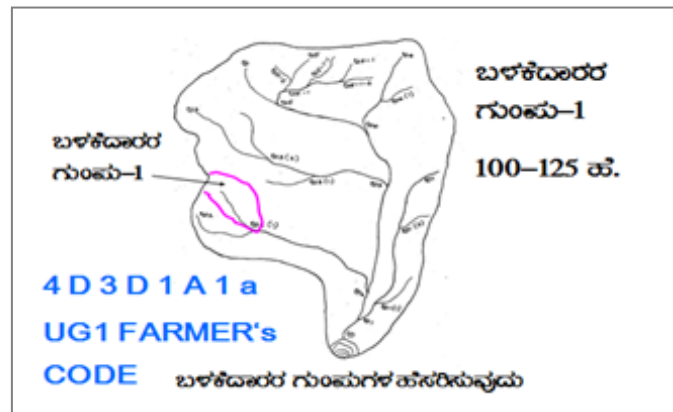
- ❖ **Available Phosphorus:** Available phosphorus is low (<23 kg/ha) in 136 ha (25%) and medium (23-57 kg/ha) in 390 ha (71%) of the soils. The areas with low and medium phosphorus content additional 25% phosphorus from the RDF.
- ❖ **Available Potassium:** Available potassium is medium (145-337 kg/ha) in 19 ha (3%) and high (>337 kg/ha) in 508 ha (93%) area of the microwatershed. The areas with high potassium content reduce 25% from the RDF to avoid the excess application of fertilizer and apply additional 25% potassium in areas where it is low and medium.
- ❖ **Available Sulphur:** Available sulphur is a very critical nutrient for oilseed crops. Available sulphur is medium (10-20 ppm) in 389 ha (71%) area of the microwatershed and high (>20 ppm) in 137 ha (25%) area of the microwatershed. Areas with medium in available sulphur need to be applied with magnesium sulphate or gypsum or Factamphos (p) fertilizer (13% sulphur) for 2-3 years for the deficiency to be corrected.
- ❖ **Available iron:** It is sufficient in the entire area of the microwatershed.
- ❖ **Available Zinc:** It is deficient (<0.6 ppm) in the entire area of the microwatershed. Application of zinc sulphate @ 25kg/ha is to be followed in areas that are deficient in available zinc.
- ❖ **Available Boron:** Available boron is low in (<0.5ppm) 477 ha (87%) and medium (0.5-1.0 ppm) in 49 ha (9%) area in the microwatershed. The areas with low in boron content need to be applied with sodium borate @ 10kg/ha as soil application or 0.2% borax as foliar spray to correct the deficiency.
- ❖ **Available manganese:** It is sufficient in the entire area of the microwatershed.
- ❖ **Available copper:** It is sufficient in the entire area of the microwatershed.
- ❖ **Soil alkalinity:** Entire area of the microwatershed has soils that are slightly to very strongly alkaline. These areas need application of gypsum and wherever calcium is in excess, iron pyrites and element sulphur can be recommended. Management practices like treating repeatedly with good quality water to drain out the excess salts and provision of subsurface drainage and growing of salt tolerant crops like Casuarina, Acasia, Neem, Ber etc, are recommended.

Land Suitability for various crops: Areas that are highly, moderately and marginally suitable and not suitable for growing various crops are indicated. Along with the suitability, various constraints that are limiting the productivity are also indicated. For example, in case of cotton, gravel content, rooting depth and salinity/alkalinity are the major constraints in various plots. With suitable management interventions, the productivity can be enhanced. In order to increase water holding capacity of light textured soils, growing of green manure crops and application of organic manure is recommended.

SOIL AND WATER CONSERVATION TREATMENT PLAN

For preparing soil and water conservation treatment plan for Bikkanahalli microwatershed, the land resource inventory database generated under Sujala-III project has been transformed as information through series of interpretative (thematic) maps using soil phase map as a base. The various thematic maps (1:7920 scale) generated were

- Soil depth
- Surface soil texture
- Available water capacity
- Soil slope
- Soil gravelliness
- Land capability
- Present land use and land cover
- Crop suitability maps
- Rainfall map
- Hydrology
- Water Resources
- Socio-economic data
- Contour plan with existing features- network of waterways, pothissa boundaries, cut up/ minor terraces etc.
- Cadastral map (1:7920 scale)
- Satellite imagery (1:7920 scale)



Apart from these, Hand Level/ Hydro Marker/ Dumpy Level/ Total Station and Kathedars' List to be collected.

Steps for Survey and Preparation of Treatment Plan

The boundaries of Land User Groups and Survey No. boundaries are traced in the field.

- Naming of user groups and farmers
- Identification of arable and non arable lands
- Identification of drainage lines and gullies
- Identification of non treatable areas
- Identification of priority areas in the arable lands
- Treatment plan for arable lands
- Location of water harvesting and recharge structures

9.1 Treatment Plan

The treatment plan recommended for arable lands is briefly described below.

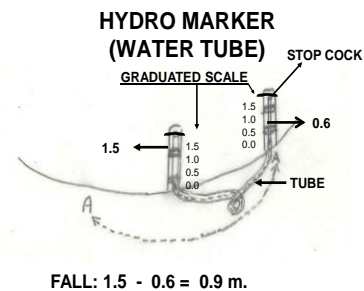
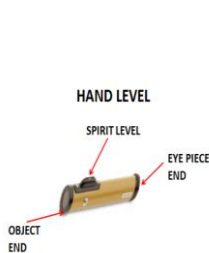
9.1.1 Arable Land Treatment

A. BUNDING

| Steps for Survey and Preparation of Treatment Plan | | USER GROUP-1 |
|--|----------------------------|--|
| Cadastral map (1:7920 scale) is enlarged to a scale of 1:2500 scale | | <p>CLASSIFICATION OF GULLIES</p> <p>ಕೊರಕಾಲಿನ ವರ್ಗೀಕರಣ</p> <ul style="list-style-type: none"> ಮೇಲ್ಭಾಗ (UPPER REACH) 15 Ha. ಮಧ್ಯಭಾಗ (MIDDLE REACH) 15+10=25 ಹೆ. ಕೆಳಭಾಗ (LOWER REACH) 25 ಹೆಚ್ಚರಗಿನ ಅಧಿಕ <p>POINT OF CONCENTRATION</p> |
| Existing network of waterways, pothissa boundaries, grass belts, natural drainage lines/ watercourse, cut ups/ terraces are marked on the cadastral map to the scale | | |
| Drainage lines are demarcated into | | |
| Small gullies | (up to 5 ha catchment) | |
| Medium gullies | (5-15 ha catchment) | |
| Ravines | (15-25 ha catchment) and | |
| Halla/Nala | (more than 25ha catchment) | |

Measurement of Land Slope

Land slope is estimated or determined by the study and interpretation of contours or by measurement in the field using simple instruments like Hand Level or Hydromarker.



Vertical and Horizontal intervals between bunds as recommended by the Watershed Development Department.

| Slope percentage | Vertical interval (m) | Corresponding Horizontal Distance (m) |
|------------------|-----------------------|---------------------------------------|
| 2 - 3% | 0.6 | 24 |
| 3 - 4% | 0.9 | 21 |
| 4 - 5% | 0.9 | 21 |
| 5 - 6% | 1.2 | 21 |
| 6 - 7% | 1.2 | 21 |

Note: i) The above intervals are maximum.

(ii) Considering the slope class and erosion status (A1... A= 0-1% slope, 1= slight erosion) the intervals have to be decided.

Bund length recording: Considering the contour plan and the existing grass belts/partitions, the bunds are aligned and lengths are measured.

Section of the Bund

Bund section is decided considering the soil texture class and gravelliness class (bg₀b = loamy sand, g₀ = <15% gravel). The recommended sections for different soils are given below.

Recommended Bund Section

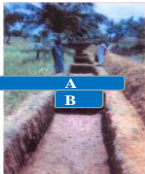
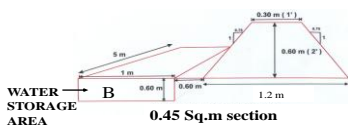
| Top width (m) | Base width (m) | Height (m) | Side slope (Z:1;H:V) | Cross section (sq m) | Soil Texture | Remarks |
|---------------|----------------|------------|----------------------|----------------------|---------------------------------|-----------------|
| 0.3 | 0.9 | 0.3 | 01:01 | 0.18 | Sandy loam | Vegetative bund |
| 0.3 | 1.2 | 0.3 | 1.5:1 | 0.225 | Sandy clay | |
| 0.3 | 1.2 | 0.5 | 0.9:1 | 0.375 | Red gravelly soils | |
| 0.3 | 1.2 | 0.6 | 0.75:1 | 0.45 | | |
| 0.3 | 1.5 | 0.6 | 01:01 | 0.54 | Red sandy loam | |
| 0.3 | 2.1 | 0.6 | 1.5:1 | 0.72 | Very shallow clayey black soils | |
| 0.45 | 2 | 0.75 | 01:01 | 0.92 | | |
| 0.45 | 2.4 | 0.75 | 1.3:1 | 1.07 | Shallow clayey black soils | |
| 0.6 | 3.1 | 0.7 | 1.78:1 | 1.29 | Medium clayey black soils | |
| 0.5 | 3 | 0.85 | 1.47:1 | 1.49 | | |

Formation of Trench cum Bund

Dimensions of the Borrow Pits/ Trenches to be excavated (machinery are decided considering the Bund Section).

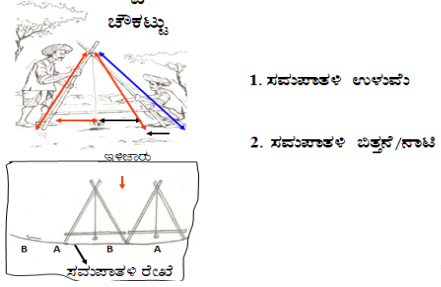
Details of Borrow Pit dimensions are given below

TRENCH CUM BUND

IDEAL FOR HORTICULTURE CROPS

'A' FRAME FOR INTERBUND MANAGEMENT



1. ಸಮಾನಾಕೃತಿ ಉಳಿಸುವುದು
2. ಸಮಾನಾಕೃತಿ ಬಿತ್ತನೆ/ನಾಟಿ

Size of Borrow Pits/ Trench recommended for Trench cum Bund (by machinery)

| Bund section | Bund length | Earth quantity | Pit | | | | Berm (pit to pit) | Soil depth Class |
|----------------|-------------|----------------|------|------|------|----------------------------|-------------------|--------------------|
| | | | L(m) | W(m) | D(m) | Quantity (m ³) | | |
| m ² | m | m ³ | | | | | m | |
| 0.375 | 6 | 2.25 | 5.85 | 0.85 | 0.45 | 2.24 | 0.15 | Shallow |
| 0.45 | 6 | 2.7 | 5.4 | 1.2 | 0.43 | 2.79 | 0.6 | Shallow |
| 0.45 | 6 | 2.7 | 5 | 0.85 | 0.65 | 2.76 | 1 | Moderately Shallow |
| 0.54 | 5.6 | 3.02 | 5.5 | 0.85 | 0.7 | 3.27 | 0.1 | Moderately shallow |
| 0.54 | 5.5 | 2.97 | 5 | 1.2 | 0.5 | 3 | 0.5 | Shallow |
| 0.72 | 6.2 | 4.46 | 6 | 1.2 | 0.7 | 5.04 | 0.2 | Moderately shallow |
| 0.72 | 5.2 | 3.74 | 5.1 | 0.85 | 0.9 | 3.9 | 0.1 | Moderately deep |

B. Waterways

- Existing waterways are marked on the cadastral map (1:7920 scale) and their dimensions are recorded.
- Considering the contour plan of the MWS, additional waterways/ modernization of the existing ones can be thought of.
- The design details are given in the Manual.

C. Farm Ponds

Waterways and the catchment area will give an indication on the size of the Farm Pond. Location of the pond can be decided based on the contour plan/ field condition and farmers' need/desire.

D. Diversion Channel

Existing EPT/ CPT are marked on the cadastral map. Looking to the need, these can be modernized or fresh diversion channel can be proposed and runoff from this can be stored in *Gokatte/* Recharge Ponds.

9.1.2 Non-Arable Land Treatment

Depending on the gravelliness and crops preferred by the farmers, the concerned authorities can decide appropriate treatment plan. The recommended treatments may be Contour Trench, Staggered Trench, Crescent Bund, Boulder Bund or Pebble Bund.

9.1.3 Treatment of Natural Water Course/ Drainage Lines

- The cadastral map has to be updated as regards the network of drainage lines (gullies/ *nalas*/ *hallas*) and existing structures are marked to the scale and storage capacity of the existing water bodies are documented (Fig.9.1).
- The drainage line will be demarcated into Upper Reach, Middle Reach and Lower Reach.
- Considering the Catchment, *Nala* bed and bank conditions, suitable structures are decided.
- Number of storage structures (Check dam/ *Nala* bund/ Percolation tank) will be decided considering the commitments and available runoff in water budgeting and quality of water in the wells and site suitability.
- Detailed Levelling Survey using Dumpy Level / Total Station has to be carried out to arrive at the site-specific designs as shown in the Manual.
- The location of ground water recharge structures are decided by examining the lineaments and fracture zones from geological maps.
- Rainfall intensity data of the nearest Rain Gauge Station is considered for Hydrologic Designs.
- Silt load to the Storage/Recharge Structures is reduced by providing vegetative, boulder and earthen checks in the natural water course. Location and design details are given in the Manual.

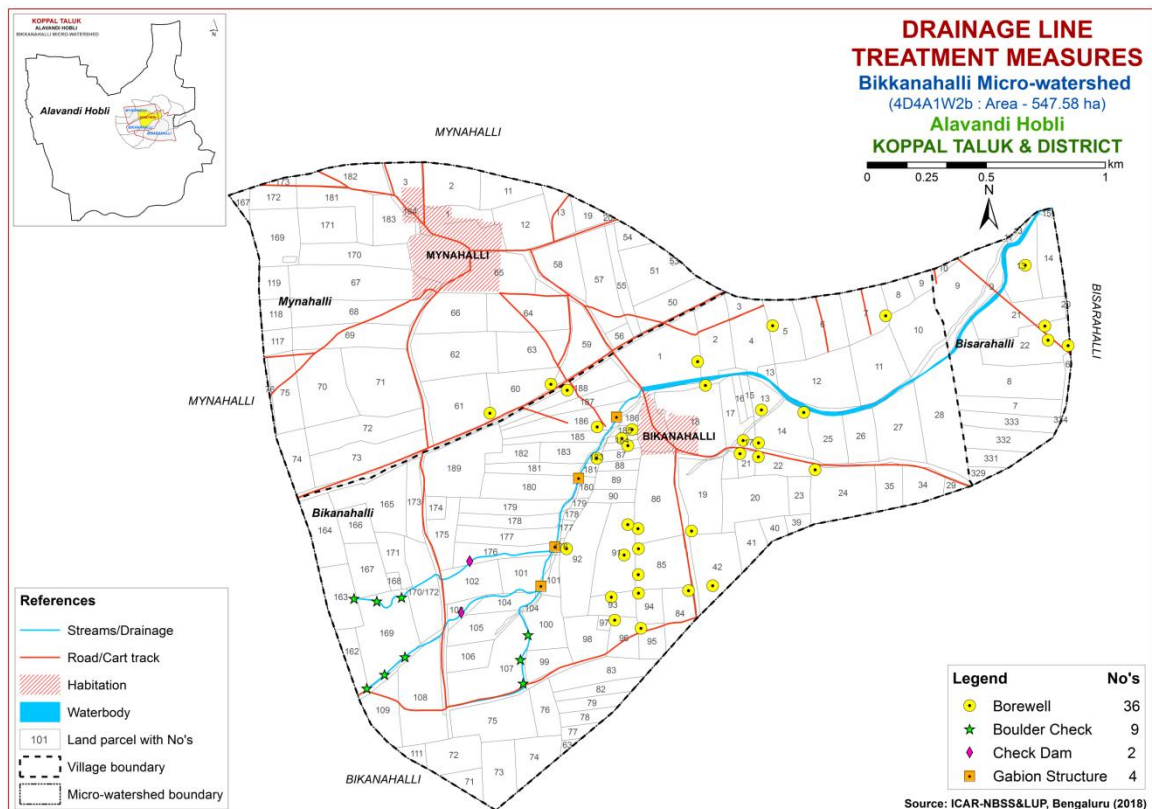


Fig. 9.1 Drainage line treatment map of Bikkanahalli Microwatershed

9.2 Recommended Soil and Water Conservation Measures

The appropriate conservation structures best suited for each of the land parcel/ survey number (Appendix-I) are selected based on the slope per cent, severity of erosion, amount of rainfall, land use and soil type. The different kinds of conservation structures recommended are

1. Graded / Strengthening of Bunds
2. Trench cum Bunds (TCB)
3. Trench cum Bunds / Strengthening
4. Crescent Bunds

A map (Fig. 9.2) showing soil and water conservation plan with different kinds of structures recommended has been prepared which shows the spatial distribution and extent of area. A maximum area of about 329 ha (60%) needs trench cum bunding. An area of about 126 ha (23%) needs graded bunding and 71 ha (13%) needs strengthening of existing bunds/bunding. The conservation plan prepared may be presented to all the stakeholders including farmers and after considering their suggestions, the conservation plan for the microwatershed may be finalized in a participatory approach.

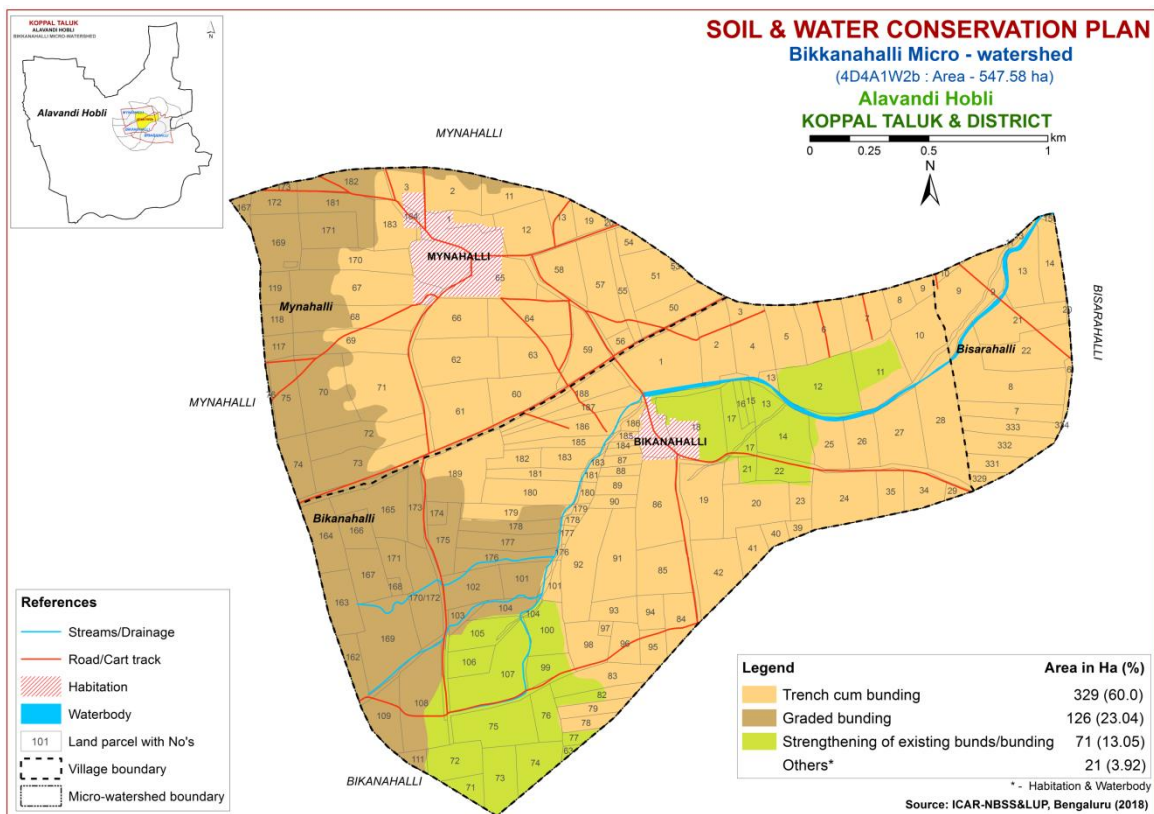


Fig. 9.2 Soil and Water Conservation Plan map of Bikkanahalli Microwatershed

9.3 Greening of Microwatershed

As part of the greening programme in the watersheds, it is envisaged to plant a variety of horticultural and other tree plants that are edible, economical and produce lot of biomass which helps to restore the ecological balance in the watersheds. The lands that

are suitable for greening programme are non-arable lands (land capability classes V, VI VII and VIII) and also the lands that are not suitable or marginally suitable for growing annual and perennial crops. The method of planting these trees is given below.

It is recommended to open the pits during the 1st week of March along the contour and heap the dugout soil on the lower side of the slope in order to harness the flowing water and facilitate weathering of soil in the pit. Exposure of soil in the pit also prevents spread of pests and diseases due to scorching sun rays. The pits should be filled with mixture of soil and organic manure during the second week of April and keep ready with sufficiently tall seedlings produced either in poly bags or in root trainer nurseries so that planting can be done during the 2nd or 3rd week of April depending on the rainfall.

The tree species suitable for the area considering rainfall, temperature and adaptability is listed below; waterlogged areas are recommended to be planted with species like Neral (*Syzgium cumini*) and Bamboo. Dry areas are to be planted with species like Honge, Bevu, Seetaphal *etc.*

| Dry Deciduous Species | | | Temp (°C) | Rainfall (mm) |
|--------------------------------|-----------|----------------------------------|------------------|----------------------|
| 1. | Bevu | <i>Azadiracta indica</i> | 21-32 | 400 -1,200 |
| 2. | Tapasi | <i>Holoptelia integrifolia</i> | 20-30 | 500 - 1000 |
| 3. | Seetaphal | <i>Anona Squamosa</i> | 20-40 | 400 - 1000 |
| 4. | Honge | <i>Pongamia pinnata</i> | 20 -50 | 500-2,500 |
| 5. | Kamara | <i>Hardwickia binata</i> | 25 -35 | 400 - 1000 |
| 6. | Bage | <i>Albezzia lebbek</i> | 20 - 45 | 500 - 1000 |
| 7. | Ficus | <i>Ficus bengalensis</i> | 20 - 50 | 500-2,500 |
| 8. | Sisso | <i>Dalbargia Sissoo</i> | 20 - 50 | 500 -2000 |
| 9. | Ailanthus | <i>Ailanthus excelsa</i> | 20 - 50 | 500 - 1000 |
| 10. | Hale | <i>Wrightia tinctoria</i> | 25 - 45 | 500 - 1000 |
| 11. | Uded | <i>Steriospermum chelanoides</i> | 25 - 45 | 500 -2000 |
| 12. | Dhupa | <i>Boswellia Serrata</i> | 20 - 40 | 500 - 2000 |
| 13. | Nelli | <i>Emblica Officinalis</i> | 20 - 50 | 500 -1500 |
| 14. | Honne | <i>Pterocarpus marsupium</i> | 20 - 40 | 500 - 2000 |
| Moist Deciduous Species | | | Temp (°C) | Rainfall (mm) |
| 15. | Teak | <i>Tectona grandis</i> | 20 - 50 | 500-5000 |
| 16. | Nandi | <i>Legarstroemia lanceolata</i> | 20 - 40 | 500 - 4000 |
| 17. | Honne | <i>Pterocarpus marsupium</i> | 20 - 40 | 500 - 3000 |
| 18. | Mathi | <i>Terminalia alata</i> | 20 -50 | 500 - 2000 |
| 19. | Shivane | <i>Gmelina arborea</i> | 20 -50 | 500 -2000 |
| 20. | Kindal | <i>T.Paniculata</i> | 20 - 40 | 500 - 1500 |
| 21. | Beete | <i>Dalbargia latifolia</i> | 20 - 40 | 500 - 1500 |
| 22. | Tare | <i>T. belerica</i> | 20 - 40 | 500 - 2000 |
| 23. | Bamboo | <i>Bambusa arundinasia</i> | 20 - 40 | 500 - 2500 |
| 24. | Bamboo | <i>Dendrocalamus strictus</i> | 20 - 40 | 500 - 2500 |
| 25. | Muthuga | <i>Butea monosperma</i> | 20 - 40 | 400 - 1500 |
| 26. | Hippe | <i>Madhuca latifolia</i> | 20 - 40 | 500 - 2000 |
| 27. | Sandal | <i>Santalum album</i> | 20 - 50 | 400 - 1000 |
| 28. | Nelli | <i>Emblica officinalis</i> | 20 - 40 | 500 - 2000 |
| 29. | Nerale | <i>Sizyium cumini</i> | 20 - 40 | 500 - 2000 |
| 30. | Dhaman | <i>Grevia tilifolia</i> | 20 - 40 | 500 - 2000 |
| 31. | Kaval | <i>Careya arborea</i> | 20 - 40 | 500 - 2000 |
| 32. | Harada | <i>Terminalia chebula</i> | 20 - 40 | 500 - 2000 |

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Appendix-I
Bikkanhalli (1W2b) Microwatershed
Soil Phase Information

| Village | Survey NO | Area (ha) | Soil Phase | LMU | Soil Depth | Surface Soil Texture | Soil Gravelliness | Available Water Capacity | Slope | Soil Erosion | Current Land Use | Wells | Land Capability | Conservation Plan |
|-------------|-----------|-----------|------------|--------|-------------------------------|----------------------|---------------------|--------------------------|----------------------------|--------------|--|---------------|-----------------|-------------------|
| Bisarahalli | 6 | 0.56 | BSRiB1g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Sunflower+Cotton+Fallow land (Sf+Ct+Fl) | Not Available | IIs | TCB |
| Bisarahalli | 7 | 2.99 | BPRiB1 | LMU-3 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | Not Available | IIIs | TCB |
| Bisarahalli | 8 | 8.23 | BSRiB1g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | Not Available | IIs | TCB |
| Bisarahalli | 9 | 6.76 | BPRiB1 | LMU-3 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | Not Available | IIIs | TCB |
| Bisarahalli | 10 | 0.35 | KMHib2g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIs | TCB |
| Bisarahalli | 11 | 0.04 | KMHib2g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Fallow land (Mz+Fl) | Not Available | IIs | TCB |
| Bisarahalli | 13 | 4.19 | KTPiB1g1 | LMU-6 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Redgram+Bengalgram+Bajra (Rg+Bg+Bj) | 1 Borewell | IIs | TCB |
| Bisarahalli | 14 | 3.16 | KTPiB1g1 | LMU-6 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Fallow land+Current fallow (Fl+Cf) | Not Available | IIs | TCB |
| Bisarahalli | 15 | 0.13 | KTPiB1g1 | LMU-6 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Fallow land (Fl) | Not Available | IIs | TCB |
| Bisarahalli | 20 | 0.09 | KTPiB1g1 | LMU-6 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Bajra+Groundnut+Chilli (Bj+Gn+Ch) | Not Available | IIs | TCB |
| Bisarahalli | 21 | 5.22 | BSRiB1g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Chilli+Bajra (Ch+Bj) | Not Available | IIs | TCB |
| Bisarahalli | 22 | 5.37 | BSRiB1g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Sunflower+Maize+Bajra+Cotton (Sf+Mz+Bj+Ct) | 3 Borewell | IIs | TCB |
| Bisarahalli | 329 | 0.7 | BPRiB1 | LMU-3 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Sunflower+Bajra (Sf+Bj) | Not Available | IIIs | TCB |
| Bisarahalli | 331 | 1.64 | BSRiB1g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | Not Available | IIs | TCB |
| Bisarahalli | 332 | 3.07 | BSRiB1g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Sunflower (Mz+Sf) | Not Available | IIs | TCB |
| Bisarahalli | 333 | 2.71 | BSRiB1g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Sunflower (Mz+Sf) | Not Available | IIs | TCB |
| Bisarahalli | 334 | 0.01 | BSRiB1g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Chilli+Sunflower (Ch+Sf) | Not Available | IIs | TCB |
| Mynahalli | 1 | 2.5 | Habitation | Others | Others | Others | Others | Others | Others | Others | Maize (Mz) | Not Available | Others | Others |
| Mynahalli | 2 | 4.22 | MKHhB2g1 | LMU-5 | Moderately shallow (50-75 cm) | Sandy clay loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIIs | TCB |
| Mynahalli | 3 | 2.43 | MKHhB2g1 | LMU-5 | Moderately shallow (50-75 cm) | Sandy clay loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIIs | TCB |
| Mynahalli | 11 | 2.74 | MKHhB2g1 | LMU-5 | Moderately shallow (50-75 cm) | Sandy clay loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIIs | TCB |
| Mynahalli | 12 | 4.29 | BSRiB2g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIs | TCB |

| Village | Survey NO | Area (ha) | Soil Phase | LMU | Soil Depth | Surface Soil Texture | Soil Gravelliness | Available Water Capacity | Slope | Soil Erosion | Current Land Use | Wells | Land Capability | Conservation Plan |
|-----------|-----------|-----------|------------|--------|-------------------------------|----------------------|---------------------|--------------------------|----------------------------|--------------|------------------------------|---------------|-----------------|-------------------|
| Mynahalli | 13 | 2.09 | HDHcB2g1 | LMU-3 | Moderately deep (75-100 cm) | Sandy loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram+Maize (Rg+Mz) | Not Available | Iles | TCB |
| Mynahalli | 19 | 1.27 | HDHcB2g1 | LMU-3 | Moderately deep (75-100 cm) | Sandy loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | TCB |
| Mynahalli | 20 | 0.1 | HDHcB2g1 | LMU-3 | Moderately deep (75-100 cm) | Sandy loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | TCB |
| Mynahalli | 50 | 3.71 | HDHiB2g1 | LMU-3 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | TCB |
| Mynahalli | 51 | 4.95 | RTRiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | High (151-200 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Ile | TCB |
| Mynahalli | 53 | 0.11 | HDHiB2g1 | LMU-3 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | TCB |
| Mynahalli | 54 | 1.11 | HDHiB2g1 | LMU-3 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | TCB |
| Mynahalli | 55 | 2 | HDHcB2g1 | LMU-3 | Moderately deep (75-100 cm) | Sandy loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | TCB |
| Mynahalli | 56 | 0.73 | RTRiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | High (151-200 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Ile | TCB |
| Mynahalli | 57 | 5.43 | RTRiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | High (151-200 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Ile | TCB |
| Mynahalli | 58 | 3.63 | HDHcB2g1 | LMU-3 | Moderately deep (75-100 cm) | Sandy loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | TCB |
| Mynahalli | 59 | 3.57 | BSRiB2g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | TCB |
| Mynahalli | 60 | 4.14 | BSRiB2g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Redgram (Mz+Rg) | 1 Borewell | Iles | TCB |
| Mynahalli | 61 | 6.47 | MKHhB2g1 | LMU-5 | Moderately shallow (50-75 cm) | Sandy clay loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Groundnut (Mz+Gn) | 1 Borewell | IIles | TCB |
| Mynahalli | 62 | 6.5 | BSRiB2g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | TCB |
| Mynahalli | 63 | 4.79 | BSRiB2g1 | LMU-2 | Moderately deep (75-100 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | TCB |
| Mynahalli | 64 | 5.81 | MKHhB2g1 | LMU-5 | Moderately shallow (50-75 cm) | Sandy clay loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIles | TCB |
| Mynahalli | 65 | 5.24 | Habitation | Others | Others | Others | Others | Others | Others | Others | Maize (Mz) | Not Available | Others | Others |
| Mynahalli | 66 | 4.43 | MKHhB2g1 | LMU-5 | Moderately shallow (50-75 cm) | Sandy clay loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIles | TCB |
| Mynahalli | 67 | 8.18 | MKHhB2g1 | LMU-5 | Moderately shallow (50-75 cm) | Sandy clay loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIles | TCB |
| Mynahalli | 68 | 5.64 | MKHhB2g1 | LMU-5 | Moderately shallow (50-75 cm) | Sandy clay loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIles | TCB |
| Mynahalli | 69 | 4.85 | MKHhB2g1 | LMU-5 | Moderately shallow (50-75 cm) | Sandy clay loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Bengalgram+Maize (Bg+Mz) | Not Available | IIles | TCB |
| Mynahalli | 70 | 6.57 | GRHmb2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Current fallow (Mz+Cf) | Not Available | Iles | Graded bunding |
| Mynahalli | 71 | 7.9 | MKHhB2g1 | LMU-5 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIles | TCB |

| Village | Survey NO | Area (ha) | Soil Phase | LMU | Soil Depth | Surface Soil Texture | Soil Gravelliness | Available Water Capacity | Slope | Soil Erosion | Current Land Use | Wells | Land Capability | Conservation Plan |
|-------------|-----------|-----------|------------|--------|-------------------------------|----------------------|---------------------|--------------------------|----------------------------|--------------|-----------------------------------|---------------|-----------------|-------------------|
| Mynahalli | 72 | 5.3 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | Graded bunding |
| Mynahalli | 73 | 5.86 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Onion (Mz+On) | Not Available | IIles | Graded bunding |
| Mynahalli | 74 | 2.72 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | Graded bunding |
| Mynahalli | 75 | 3.82 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Current fallow (Cf) | Not Available | Iles | Graded bunding |
| Mynahalli | 76 | 0.31 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Current fallow (Cf) | Not Available | Iles | Graded bunding |
| Mynahalli | 117 | 1.25 | BDRmB2 | LMU-4 | Very deep (>150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Bengalgram (Bg) | Not Available | Iles | Graded bunding |
| Mynahalli | 118 | 1.64 | BDRmB2 | LMU-4 | Very deep (>150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Bengalgram (Mz+Bg) | Not Available | Iles | Graded bunding |
| Mynahalli | 119 | 1.74 | BDRmB2 | LMU-4 | Very deep (>150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Bengalgram (Bg) | Not Available | Iles | Graded bunding |
| Mynahalli | 167 | 0.66 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Current fallow+Bengalgram (Cf+Bg) | Not Available | Iles | Graded bunding |
| Mynahalli | 169 | 4.43 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | Graded bunding |
| Mynahalli | 170 | 4.32 | MKHhB2g1 | LMU-5 | Moderately shallow (50-75 cm) | Sandy clay loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIles | TCB |
| Mynahalli | 171 | 3.6 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIles | Graded bunding |
| Mynahalli | 172 | 1.92 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Bengalgram (Bg) | Not Available | Iles | Graded bunding |
| Mynahalli | 173 | 0.38 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Bengalgram (Bg) | Not Available | Iles | Graded bunding |
| Mynahalli | 181 | 3.65 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Bajra (Bj) | Not Available | IIles | Graded bunding |
| Mynahalli | 182 | 3.5 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | Graded bunding |
| Mynahalli | 183 | 2.95 | MKHhB2g1 | LMU-5 | Moderately shallow (50-75 cm) | Sandy clay loam | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIles | TCB |
| Mynahalli | 184 | 0.62 | Habitation | Others | Others | Others | Others | Others | Others | Others | Maize (Mz) | Not Available | Others | Others |
| Bikanahalli | 1 | 7.65 | KMHhB2g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Chilli+Groundnut (Mz+Ch+Gn) | 1 Borewell | Iles | TCB |
| Bikanahalli | 2 | 4.31 | KMHhB2g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Horsegram (Mz+Hg) | Not Available | Iles | TCB |
| Bikanahalli | 3 | 1.03 | KMHhB2g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | TCB |
| Bikanahalli | 4 | 3.83 | KMHhB2g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Groundnut (Mz+gn) | Not Available | Iles | TCB |
| Bikanahalli | 5 | 3.41 | KMHhB2g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Horsegram (Mz+Hg) | 1 Borewell | Iles | TCB |
| Bikanahalli | 6 | 4.61 | KMHhB2g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | Iles | TCB |

| Village | Survey NO | Area (ha) | Soil Phase | LMU | Soil Depth | Surface Soil Texture | Soil Gravelliness | Available Water Capacity | Slope | Soil Erosion | Current Land Use | Wells | Land Capability | Conservation Plan |
|-------------|-----------|-----------|------------|-------|---------------------|----------------------|---------------------|--------------------------|----------------------------|--------------|------------------------------------|---------------|-----------------|-------------------|
| Bikanahalli | 7 | 3.73 | KMHiB2g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | 1 Borewell | IIs | TCB |
| Bikanahalli | 8 | 1.42 | KMHiB2g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Redgram (Mz+Rg) | Not Available | IIs | TCB |
| Bikanahalli | 9 | 0.84 | KMHiB2g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Horsegram (Mz+Hg) | Not Available | IIs | TCB |
| Bikanahalli | 10 | 4.81 | BPRiB1 | LMU-3 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Chilli (Mz+Ch) | Not Available | IIIs | TCB |
| Bikanahalli | 11 | 5.29 | KDTmA1 | LMU-4 | Very deep (>150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Maize+Groundnut+Redgram (Mz+Gn+Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 12 | 6.63 | KDTmA1 | LMU-4 | Very deep (>150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Maize (Mz) | Not Available | IIs | Graded bunding |
| Bikanahalli | 13 | 1.92 | KMHiA1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Nearly level (0-1%) | Slight | Redgram+Maize (Rg+Mz) | 1 Borewell | IIs | Graded bunding |
| Bikanahalli | 14 | 4.15 | KMHiA1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Nearly level (0-1%) | Slight | Groundnut+Chilli (Gn+Ch) | 2 Borewell | IIs | Graded bunding |
| Bikanahalli | 15 | 0.56 | KMHiA1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Nearly level (0-1%) | Slight | Redgram (Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 16 | 0.65 | KMHiA1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Nearly level (0-1%) | Slight | Redgram (Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 17 | 2.63 | KMHiA1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Nearly level (0-1%) | Slight | Maize (Mz) | 1 Borewell | IIs | Graded bunding |
| Bikanahalli | 18 | 6.72 | KMHiA1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Nearly level (0-1%) | Slight | Maize+Chilli (Mz+Ch) | Not Available | IIs | Graded bunding |
| Bikanahalli | 19 | 5.09 | NDLiB1g1 | LMU-3 | Very deep (>150 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Bajra+Redgram (Bj+Rg) | 1 Borewell | IIs | TCB |
| Bikanahalli | 20 | 5.26 | NDLiB1g1 | LMU-3 | Very deep (>150 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | Not Available | IIs | TCB |
| Bikanahalli | 21 | 0.81 | KMHiA1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Nearly level (0-1%) | Slight | Maize (Mz) | 1 Borewell | IIs | Graded bunding |
| Bikanahalli | 22 | 1.91 | KMHiA1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Nearly level (0-1%) | Slight | Chilli+Maize (Ch+Mz) | 1 Borewell | IIs | Graded bunding |
| Bikanahalli | 23 | 1.48 | NDLiB1g1 | LMU-3 | Very deep (>150 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | Not Available | IIs | TCB |
| Bikanahalli | 24 | 6.03 | KMHiB1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Redgram (Mz+Rg) | 1 Borewell | IIs | TCB |
| Bikanahalli | 25 | 3.12 | KMHiB1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Redgram (Mz+Rg) | Not Available | IIs | TCB |
| Bikanahalli | 26 | 2.88 | KMHiB1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Slight | Redgram (Rg) | Not Available | IIs | TCB |
| Bikanahalli | 27 | 5.36 | KMHiB1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Slight | Redgram+Chilli+Maize (Rg+Ch+Mz) | Not Available | IIs | TCB |
| Bikanahalli | 28 | 7.91 | BPRiB1 | LMU-3 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Chilli+Maize+Redgram (Ch+Mz+Rg) | Not Available | IIIs | TCB |
| Bikanahalli | 29 | 0.47 | BPRiB1 | LMU-3 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | Not Available | IIIs | TCB |
| Bikanahalli | 34 | 2.42 | KMHiB1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Slight | Redgram+Chilli+Maize (Rg+Ch+Mz) | Not Available | IIs | TCB |

| Village | Survey NO | Area (ha) | Soil Phase | LMU | Soil Depth | Surface Soil Texture | Soil Gravelliness | Available Water Capacity | Slope | Soil Erosion | Current Land Use | Wells | Land Capability | Conservation Plan |
|-------------|-----------|-----------|------------|-------|-----------------------------|----------------------|------------------------|--------------------------|----------------------------|--------------|------------------------------------|---------------|-----------------|-------------------|
| Bikanahalli | 35 | 2.14 | KMH1B1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Redgram (Mz+Rg) | Not Available | IIs | TCB |
| Bikanahalli | 39 | 0.68 | NDLiB1g1 | LMU-3 | Very deep (>150 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Groundnut (Mz+Gn) | Not Available | IIs | TCB |
| Bikanahalli | 40 | 0.97 | NDLiB1g1 | LMU-3 | Very deep (>150 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Groundnut (Mz+Gn) | Not Available | IIs | TCB |
| Bikanahalli | 41 | 1.95 | NDLiB1g1 | LMU-3 | Very deep (>150 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | Not Available | IIs | TCB |
| Bikanahalli | 42 | 5.05 | NDLiB1g1 | LMU-3 | Very deep (>150 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize+sugarcane (Mz+Sc) | 1 Borewell | IIs | TCB |
| Bikanahalli | 63 | 0.27 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Redgram (Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 71 | 1.34 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Onion+Maize+Sunflower (On+Mz+Sf) | Not Available | IIs | Graded bunding |
| Bikanahalli | 72 | 3.25 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Maize+Sunflower (Mz+Sf) | Not Available | IIs | Graded bunding |
| Bikanahalli | 73 | 3.71 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Maize (Mz) | Not Available | IIs | Graded bunding |
| Bikanahalli | 74 | 3 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Maize (Mz) | Not Available | IIs | Graded bunding |
| Bikanahalli | 75 | 5.5 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Redgram+Sugarcane (Rg+Sc) | Not Available | IIs | Graded bunding |
| Bikanahalli | 76 | 2.28 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Redgram (Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 77 | 0.71 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Maize+Redgram (Mz+Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 78 | 1.23 | BPRhB1g1 | LMU-3 | Deep (100-150 cm) | Sandy clay loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Redgram (Mz+Rg) | Not Available | IIIs | TCB |
| Bikanahalli | 79 | 1.53 | BPRhB1g1 | LMU-3 | Deep (100-150 cm) | Sandy clay loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | Not Available | IIIs | TCB |
| Bikanahalli | 82 | 1.78 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Redgram (Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 83 | 3.79 | BPRhB1g1 | LMU-3 | Deep (100-150 cm) | Sandy clay loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Bajra+Redgram (Mz+Bj+Rg) | Not Available | IIIs | TCB |
| Bikanahalli | 84 | 2.74 | BDGcB1g2 | LMU-3 | Moderately deep (75-100 cm) | Sandy loam | Very gravelly (35-60%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Groundnut (Mz+gn) | 1 Borewell | IIIs | TCB |
| Bikanahalli | 85 | 4.59 | BPRiB1g1 | LMU-3 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Redgram+Maize+Groundnut (Rg+Mz+Gn) | 2 Borewell | IIIs | TCB |
| Bikanahalli | 86 | 6.48 | HRViB1g2 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Very gravelly (35-60%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Redgram (Mz+Rg) | 1 Borewell | IIIs | TCB |
| Bikanahalli | 87 | 0.79 | HRViB1g2 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Very gravelly (35-60%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Slight | Chilli+Onion (Ch+On) | Not Available | IIIs | TCB |
| Bikanahalli | 88 | 0.72 | HRViB1g2 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Very gravelly (35-60%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Slight | Chilli+Maize (Ch+Mz) | Not Available | IIIs | TCB |
| Bikanahalli | 89 | 1.4 | HRViB1g2 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Very gravelly (35-60%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Slight | Bajra+Redgram (Bj+Rg) | Not Available | IIIs | TCB |
| Bikanahalli | 90 | 1.07 | HRViB1g2 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Very gravelly (35-60%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Slight | Chilli+Maize (Ch+Mz) | Not Available | IIIs | TCB |

| Village | Survey NO | Area (ha) | Soil Phase | LMU | Soil Depth | Surface Soil Texture | Soil Gravelliness | Available Water Capacity | Slope | Soil Erosion | Current Land Use | Wells | Land Capability | Conservation Plan |
|-------------|-----------|-----------|------------|-------|-----------------------------|----------------------|---------------------|--------------------------|----------------------------|--------------|--|---------------|-----------------|-------------------|
| Bikanahalli | 91 | 5.71 | BPRiB1g1 | LMU-3 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | 2 Borewell | IIIs | TCB |
| Bikanahalli | 92 | 6.43 | BPRiB1g1 | LMU-3 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | 1 Borewell | IIIs | TCB |
| Bikanahalli | 93 | 1.86 | BPRhB1g1 | LMU-3 | Deep (100-150 cm) | Sandy clay loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | 1 Borewell | IIIs | TCB |
| Bikanahalli | 94 | 1.63 | BPRhB1g1 | LMU-3 | Deep (100-150 cm) | Sandy clay loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | 1 Borewell | IIIs | TCB |
| Bikanahalli | 95 | 1.62 | BPRhB1g1 | LMU-3 | Deep (100-150 cm) | Sandy clay loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | 1 Borewell | IIIs | TCB |
| Bikanahalli | 96 | 2.13 | BPRhB1g1 | LMU-3 | Deep (100-150 cm) | Sandy clay loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | 1 Borewell | IIIs | TCB |
| Bikanahalli | 97 | 0.35 | BPRhB1g1 | LMU-3 | Deep (100-150 cm) | Sandy clay loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | Not Available | IIIs | TCB |
| Bikanahalli | 98 | 3.01 | BPRhB1g1 | LMU-3 | Deep (100-150 cm) | Sandy clay loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Slight | Maize (Mz) | Not Available | IIIs | TCB |
| Bikanahalli | 99 | 1.95 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Redgram (Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 100 | 3.2 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Redgram+Bengalgram (Rg+Bg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 101 | 3.57 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIIs | Graded bunding |
| Bikanahalli | 102 | 3.48 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Redgram (Mz+Rg) | Not Available | IIIs | Graded bunding |
| Bikanahalli | 103 | 0.96 | DRLmB2g1 | LMU-4 | Moderately deep (75-100 cm) | Clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 104 | 1.83 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Fallow land (Fl) | Not Available | IIIs | Graded bunding |
| Bikanahalli | 105 | 2.71 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Redgram (Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 106 | 2.07 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Redgram (Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 107 | 6.77 | GRHmA1 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Nearly level (0-1%) | Slight | Redgram+Maize (Rg+Mz) | Not Available | IIs | Graded bunding |
| Bikanahalli | 108 | 7.22 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Sunflower+Fallow land (Mz+Sf+Fl) | Not Available | IIs | Graded bunding |
| Bikanahalli | 109 | 3.24 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIs | Graded bunding |
| Bikanahalli | 111 | 0.72 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Bengalgram+Jowar (Bg+Jw) | Not Available | IIs | Graded bunding |
| Bikanahalli | 162 | 1.86 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 163 | 3.44 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Bengalgram+Jowar (Bg+Jw) | Not Available | IIs | Graded bunding |
| Bikanahalli | 164 | 3.82 | NSPmB2 | LMU-4 | Moderately deep (75-100 cm) | Clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Bengalgram+Bajra+Redgram (Bg+Bj+Rg) | Not Available | IIs | Graded bunding |
| Bikanahalli | 165 | 5.32 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Mango (Mg) | Not Available | IIIs | Graded bunding |

| Village | Survey NO | Area (ha) | Soil Phase | LMU | Soil Depth | Surface Soil Texture | Soil Gravelliness | Available Water Capacity | Slope | Soil Erosion | Current Land Use | Wells | Land Capability | Conservation Plan |
|-------------|-----------|-----------|------------|-------|-----------------------------|----------------------|------------------------|--------------------------|----------------------------|--------------|-------------------------------------|---------------|-----------------|-------------------|
| Bikanahalli | 166 | 2.13 | NSPmB2 | LMU-4 | Moderately deep (75-100 cm) | Clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Mango (Mg) | Not Available | Iles | Graded bunding |
| Bikanahalli | 167 | 3.2 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Bajra+Onion+Redgram (Bj+On+Rg) | Not Available | IIles | Graded bunding |
| Bikanahalli | 168 | 0.37 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram+Bengalgram (Rg+Bg) | Not Available | IIles | Graded bunding |
| Bikanahalli | 169 | 7.46 | GRHmB2 | LMU-4 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Bajra+Jowar+Fallow land (Bj+Jw+Fl) | Not Available | Iles | Graded bunding |
| Bikanahalli | 170/172 | 4.71 | DRLmB2g1 | LMU-4 | Moderately deep (75-100 cm) | Clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram+Bengalgram+Maize (Rg+Bg+Mz) | Not Available | Iles | Graded bunding |
| Bikanahalli | 171 | 2.06 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Bajra+Redgram (Bj+Rg) | Not Available | IIles | Graded bunding |
| Bikanahalli | 173 | 2.16 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Redgram (Mz+Rg) | Not Available | IIles | Graded bunding |
| Bikanahalli | 174 | 0.8 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIles | Graded bunding |
| Bikanahalli | 175 | 2.64 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIles | Graded bunding |
| Bikanahalli | 176 | 2.89 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIles | Graded bunding |
| Bikanahalli | 177 | 3.28 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Redgram (Mz+Rg) | Not Available | IIles | Graded bunding |
| Bikanahalli | 178 | 2.65 | MTLmB2g1 | LMU-7 | Shallow (25-50 cm) | Clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Redgram (Mz+Rg) | Not Available | IIles | Graded bunding |
| Bikanahalli | 179 | 3.12 | HRViB2g1 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Redgram (Mz+Rg) | Not Available | IIles | TCB |
| Bikanahalli | 180 | 4.74 | HRViB2g1 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram+Fallow land (Rg+Fl) | Not Available | IIles | TCB |
| Bikanahalli | 181 | 2.29 | HRViB2g1 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIles | TCB |
| Bikanahalli | 182 | 1.57 | HRViB2g1 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIles | TCB |
| Bikanahalli | 183 | 2.19 | HRViB2g1 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | 1 Borewell | IIles | TCB |
| Bikanahalli | 184 | 0.32 | HRViB1g2 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Very gravelly (35-60%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Slight | Maize+Redgram (Mz+Rg) | 1 Borewell | IIIs | TCB |
| Bikanahalli | 185 | 2.13 | HRViB2g1 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | 1 Borewell | IIles | TCB |
| Bikanahalli | 186 | 4.44 | HRViB2g1 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Onoin+Chilli (Mz+On+Ch) | 1 Borewell | IIles | TCB |
| Bikanahalli | 187 | 2.84 | HRViB2g1 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize (Mz) | Not Available | IIles | TCB |
| Bikanahalli | 188 | 3.31 | KMHIB2g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Redgram (Mz+Rg) | 1 Borewell | Iles | TCB |
| Bikanahalli | 189 | 6.6 | HRViB2g1 | LMU-8 | Shallow (25-50 cm) | Sandy clay | Gravelly (15-35%) | Very Low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Maize+Chilli+Redgram (Mz+Ch+Rg) | Not Available | IIles | TCB |

TCB-Trench cum bunding

Appendix III
Bikkanhalli (1W2b) Microwatershed
Soil Suitability Information

| Village | Survey Number | Mango | Maize | Sapota | Sorghum | Guava | Cotton | Tamarind | Lime | Bengal gram | Sunflower | Red gram | Amla | Jackfruit | Custard-apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Marigold | Chrysanthemum | Pomegranate | Bajra | Jasmine | Bhendi | Brinjal | Crossandra | Drumstick | Mulberry | Onion | | |
|-------------|---------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|------------|---------------|------------|------------|------------|------------|------------|------------|------------|---------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Bisarahalli | 6 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2r | S2rg | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S1 | S1 | S2tg | S2tg | S2rg | S1 | S2tg | S2t | S1 | S2gt | S2r | S2r | S2t | | |
| Bisarahalli | 7 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2gt | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | S2g | |
| Bisarahalli | 8 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2r | S2rg | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S1 | S1 | S2tg | S2tg | S2rg | S1 | S2tg | S2t | S1 | S2gt | S2r | S2r | S2t | | |
| Bisarahalli | 9 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2gt | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | S2g | |
| Bisarahalli | 10 | S2rg | S2g | S2g | S2g | S2g | S2t | S2rg | S2g | S2gt | S2g | S2g | S1 | S2g | S1 | S1 | S2rg | S2g | S2gt | S2g | S2g | S2g | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S1 | S1 | |
| Bisarahalli | 11 | S2rg | S2g | S2g | S2g | S2g | S2t | S2rg | S2g | S2gt | S2g | S2g | S1 | S2g | S1 | S1 | S2rg | S2g | S2gt | S2g | S2g | S2g | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S1 | S1 | |
| Bisarahalli | 13 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rt | S3rg | S3rg | S2r | S3r | S2r | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2rg | S2rg | S2r | S2r | S2rg | S3rg | S3rg | S2r | S2r | |
| Bisarahalli | 14 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rt | S3rg | S3rg | S2r | S3r | S2r | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2rg | S2rg | S2r | S2r | S2rg | S3rg | S3rg | S2r | S2r | |
| Bisarahalli | 15 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rt | S3rg | S3rg | S2r | S3r | S2r | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2rg | S2rg | S2r | S2r | S2rg | S3rg | S3rg | S2r | S2r | |
| Bisarahalli | 20 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rt | S3rg | S3rg | S2r | S3r | S2r | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2rg | S2rg | S2r | S2r | S2rg | S3rg | S3rg | S2r | S2r | |
| Bisarahalli | 21 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2r | S2rg | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S1 | S1 | S2tg | S2tg | S2rg | S1 | S2tg | S2t | S1 | S2gt | S2r | S2r | S2t | S2t | |
| Bisarahalli | 22 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2r | S2rg | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S1 | S1 | S2tg | S2tg | S2rg | S1 | S2tg | S2t | S1 | S2gt | S2r | S2r | S2t | S2t | |
| Bisarahalli | 329 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2gt | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | S2g | S2g |
| Bisarahalli | 331 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2r | S2rg | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S1 | S1 | S2tg | S2tg | S2rg | S1 | S2tg | S2t | S1 | S2gt | S2r | S2r | S2t | S2t | |
| Bisarahalli | 332 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2r | S2rg | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S1 | S1 | S2tg | S2tg | S2rg | S1 | S2tg | S2t | S1 | S2gt | S2r | S2r | S2t | S2t | |
| Bisarahalli | 333 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2r | S2rg | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S1 | S1 | S2tg | S2tg | S2rg | S1 | S2tg | S2t | S1 | S2gt | S2r | S2r | S2t | S2t | |
| Bisarahalli | 334 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2r | S2rg | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S1 | S1 | S2tg | S2tg | S2rg | S1 | S2tg | S2t | S1 | S2gt | S2r | S2r | S2t | S2t | |
| Mynahalli | 1 | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Other s | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers |
| Mynahalli | 2 | N1r | S2rg | S3rg | S2rg | S3rg | S2rg | N1r | S3rg | S2rt | S3rg | S3rg | S2rg | S3rg | S2rg | S3rg | S3rg | S3rg | S2rg | S2rg | S2rg | S2rg | S2rg | S2rg | S3rg | S2rg | S2rg | S3g | S3g | S2rg | S3rg | S3rg | S3g | S3g |
| Mynahalli | 3 | N1r | S2rg | S3rg | S2rg | S3rg | S2rg | N1r | S3rg | S2rt | S3rg | S3rg | S2rg | S3rg | S2rg | S3rg | S3rg | S3rg | S2rg | S2rg | S2rg | S2rg | S2rg | S2rg | S3rg | S2rg | S2rg | S3g | S3g | S2rg | S3rg | S3rg | S3g | S3g |
| Mynahalli | 11 | N1r | S2rg | S3rg | S2rg | S3rg | S2rg | N1r | S3rg | S2rt | S3rg | S3rg | S2rg | S3rg | S2rg | S3rg | S3rg | S3rg | S2rg | S2rg | S2rg | S2rg | S2rg | S2rg | S3rg | S2rg | S2rg | S3g | S3g | S2rg | S3rg | S3rg | S3g | S3g |
| Mynahalli | 12 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2rg | S2r | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S2g | S2g | S2tg | S2tg | S2rg | S2g | S2tg | S2t | S1 | S2gt | S2rg | S2r | S2t | S2t | |
| Mynahalli | 13 | S3rg | S3g | S2rg | S3g | S2rg | S3rg | S3rg | S2rg | S3g | S3rg | S3g | S2rg | S2rg | S2rg | S2rg | S2rg | S2rg | S2g | S3g | S3g | S3g | S3g | S2rg | S2g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S3g |
| Mynahalli | 19 | S3rg | S3g | S2rg | S3g | S2rg | S3rg | S3rg | S2rg | S3g | S3rg | S3g | S2rg | S2rg | S2rg | S2rg | S2rg | S2rg | S2g | S3g | S3g | S3g | S3g | S2rg | S2g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S3g |

| Village | Survey Number | Mango | Maize | Sapota | Sorghum | Guava | Cotton | Tamarind | Lime | Bengal gram | Sunflower | Red gram | Amla | Jackfruit | Custard-apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Marigold | Chrysanthemum | Pomegranate | Bajra | Jasmine | Bhendi | Brinjal | Crossandra | Drumstick | Mulberry | Onion | |
|-----------|---------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|------------|---------------|------------|------------|------------|------------|------------|------------|------------|---------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|-----|
| Mynahalli | 20 | S3rg | S3g | S2rg | S3g | S2rg | S3rg | S3rg | S2rg | S3g | S3rg | S3g | S2rg | S2rg | S2rg | S2rg | S2rg | S2rg | S2g | S3g | S3g | S3g | S3g | S2rg | S2g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S3g |
| Mynahalli | 50 | S3rg | S3g | S2rg | S3g | S2rg | S3rg | S3rg | S2rg | S3g | S3rg | S3g | S2rg | S2rg | S2rg | S2rg | S2rg | S2rg | S2g | S3g | S3g | S3g | S3g | S2rg | S2g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S3g |
| Mynahalli | 51 | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S2t | S2t | S1 | S1 | S1 | S2t | |
| Mynahalli | 53 | S3rg | S3g | S2rg | S3g | S2rg | S3rg | S3rg | S2rg | S3g | S3rg | S3g | S2rg | S2rg | S2rg | S2rg | S2rg | S2rg | S2g | S3g | S3g | S3g | S3g | S2rg | S2g | S3g | S3g | S3g | S3g | S3g | S2g | S3g | |
| Mynahalli | 54 | S3rg | S3g | S2rg | S3g | S2rg | S3rg | S3rg | S2rg | S3g | S3rg | S3g | S2rg | S2rg | S2rg | S2rg | S2rg | S2rg | S2g | S3g | S3g | S3g | S3g | S2rg | S2g | S3g | S3g | S3g | S3g | S3g | S2g | S3g | |
| Mynahalli | 55 | S3rg | S3g | S2rg | S3g | S2rg | S3rg | S3rg | S2rg | S3g | S3rg | S3g | S2rg | S2rg | S2rg | S2rg | S2rg | S2rg | S2g | S3g | S3g | S3g | S3g | S2rg | S2g | S3g | S3g | S3g | S3g | S3g | S2g | S3g | |
| Mynahalli | 56 | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S2t | S2t | S1 | S1 | S1 | S2t | |
| Mynahalli | 57 | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S2t | S2t | S1 | S1 | S1 | S2t | |
| Mynahalli | 58 | S3rg | S3g | S2rg | S3g | S2rg | S3rg | S3rg | S2rg | S3g | S3rg | S3g | S2rg | S2rg | S2rg | S2rg | S2rg | S2rg | S2g | S3g | S3g | S3g | S3g | S2rg | S2g | S3g | S3g | S3g | S3g | S3g | S2g | S3g | |
| Mynahalli | 59 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2rg | S2r | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S2g | S2g | S2tg | S2tg | S2rg | S2g | S2tg | S2t | S1 | S2gt | S2rg | S2r | S2t | |
| Mynahalli | 60 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2rg | S2r | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S2g | S2g | S2tg | S2tg | S2rg | S2g | S2tg | S2t | S1 | S2gt | S2rg | S2r | S2t | |
| Mynahalli | 61 | N1r | S2rg | S3rg | S2rg | S3rg | S2rg | N1r | S3rg | S2rt | S3rg | S3rg | S2rg | S3rg | S2rg | S3rg | S3rg | S3rg | S2rg | S2rg | S2rg | S2rg | S2rg | S3rg | S2rg | S2rg | S3g | S3g | S2rg | S3rg | S3rg | S3g | |
| Mynahalli | 62 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2rg | S2r | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S2g | S2g | S2tg | S2tg | S2rg | S2g | S2tg | S2t | S1 | S2gt | S2rg | S2r | S2t | |
| Mynahalli | 63 | S3r | S2tg | S2rg | S2g | S2rt | S2rg | S3r | S2rg | S2gt | S2rg | S2r | S1 | S2rg | S1 | S2rt | S2rg | S2rg | S2t | S2g | S2g | S2tg | S2tg | S2rg | S2g | S2tg | S2t | S1 | S2gt | S2rg | S2r | S2t | |
| Mynahalli | 64 | N1r | S2rg | S3rg | S2rg | S3rg | S2rg | N1r | S3rg | S2rt | S3rg | S3rg | S2rg | S3rg | S2rg | S3rg | S3rg | S3rg | S2rg | S2rg | S2rg | S2rg | S2rg | S3rg | S2rg | S2rg | S3g | S3g | S2rg | S3rg | S3rg | S3g | |
| Mynahalli | 65 | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | Othe rs | |
| Mynahalli | 66 | N1r | S2rg | S3rg | S2rg | S3rg | S2rg | N1r | S3rg | S2rt | S3rg | S3rg | S2rg | S3rg | S2rg | S3rg | S3rg | S3rg | S2rg | S2rg | S2rg | S2rg | S2rg | S3rg | S2rg | S2rg | S3g | S3g | S2rg | S3rg | S3rg | S3g | |
| Mynahalli | 67 | N1r | S2rg | S3rg | S2rg | S3rg | S2rg | N1r | S3rg | S2rt | S3rg | S3rg | S2rg | S3rg | S2rg | S3rg | S3rg | S3rg | S2rg | S2rg | S2rg | S2rg | S2rg | S3rg | S2rg | S2rg | S3g | S3g | S2rg | S3rg | S3rg | S3g | |
| Mynahalli | 68 | N1r | S2rg | S3rg | S2rg | S3rg | S2rg | N1r | S3rg | S2rt | S3rg | S3rg | S2rg | S3rg | S2rg | S3rg | S3rg | S3rg | S2rg | S2rg | S2rg | S2rg | S2rg | S3rg | S2rg | S2rg | S3g | S3g | S2rg | S3rg | S3rg | S3g | |
| Mynahalli | 69 | N1r | S2rg | S3rg | S2rg | S3rg | S2rg | N1r | S3rg | S2rt | S3rg | S3rg | S2rg | S3rg | S2rg | S3rg | S3rg | S3rg | S2rg | S2rg | S2rg | S2rg | S2rg | S3rg | S2rg | S2rg | S3g | S3g | S2rg | S3rg | S3rg | S3g | |
| Mynahalli | 70 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Mynahalli | 71 | N1r | S2rg | S3rg | S2rg | S3rg | S2rg | N1r | S3rg | S2rt | S3rg | S3rg | S2rg | S3rg | S2rg | S3rg | S3rg | S3rg | S2rg | S2rg | S2rg | S2rg | S2rg | S3rg | S2rg | S2rg | S3g | S3g | S2rg | S3rg | S3rg | S3g | |
| Mynahalli | 72 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Mynahalli | 73 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3gz | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt | |
| Mynahalli | 74 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Mynahalli | 75 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |

| Village | Survey Number | Mango | Maize | Sapota | Sorghum | Guava | Cotton | Tamarind | Lime | Bengal gram | Sunflower | Red gram | Amla | Jackfruit | Custard-apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Marrigold | Chrysanthemum | Pomegranate | Bajra | Jasmine | Bhendi | Brinjal | Crossandra | Drumstick | Mulberry | Onion | | | | | |
|-------------|---------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|------------|---------------|------------|------------|------------|------------|------------|------------|------------|---------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Mynahalli | 76 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | | | |
| Mynahalli | 117 | S3t | S2t | S3t | S1 | S3t | S1 | S2t | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2t | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S3t | S3t | S2t | S2t | S2t | S2t | S2t | S3t | S2t | S3t | S3t | | |
| Mynahalli | 118 | S3t | S2t | S3t | S1 | S3t | S1 | S2t | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2t | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S3t | S3t | S2t | S2t | S2t | S2t | S2t | S3t | S2t | S3t | S3t | | |
| Mynahalli | 119 | S3t | S2t | S3t | S1 | S3t | S1 | S2t | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2t | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S3t | S3t | S2t | S2t | S2t | S2t | S2t | S2t | S3t | S2t | S3t | S3t | |
| Mynahalli | 167 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S3t | S3t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Mynahalli | 169 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S3t | S3t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Mynahalli | 170 | N1r | S2rg | S3rg | S2rg | S3rg | S2rg | N1r | S3rg | S2rt | S3rg | S3rg | S2rg | S3rg | S2rg | S3rg | S3rg | S3rg | S2rg | S2rg | S2rg | S2rg | S2rg | S3rg | S2rg | S2rg | S3g | S3g | S2rg | S3rg | S3rg | S3rg | S3g | S3g | S2rg | S3rg | S3g |
| Mynahalli | 171 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt | S3rt | S3rt | S3rt | S3rt | |
| Mynahalli | 172 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S3t | S3t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Mynahalli | 173 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S3t | S3t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Mynahalli | 181 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt | S3rt | S3rt | S3rt | S3rt | |
| Mynahalli | 182 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S3t | S3t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Mynahalli | 183 | N1r | S2rg | S3rg | S2rg | S3rg | S2rg | N1r | S3rg | S2rt | S3rg | S3rg | S2rg | S3rg | S2rg | S3rg | S3rg | S3rg | S2rg | S2rg | S2rg | S2rg | S2rg | S3rg | S2rg | S2rg | S3g | S3g | S2rg | S3rg | S3rg | S3g | S3g | S2rg | S3rg | S3g | |
| Mynahalli | 184 | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers | Oth ers |
| Bikanahalli | 1 | S2rg | S2g | S2g | S2g | S2g | S2t | S2rg | S2g | S2gt | S2g | S2g | S1 | S2g | S1 | S1 | S2rg | S2g | S2gt | S2g | S2g | S2g | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S1 | S1 | |
| Bikanahalli | 2 | S2rg | S2g | S2g | S2g | S2g | S2t | S2rg | S2g | S2gt | S2g | S2g | S1 | S2g | S1 | S1 | S2rg | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S1 | |
| Bikanahalli | 3 | S2rg | S2g | S2g | S2g | S2g | S2t | S2rg | S2g | S2gt | S2g | S2g | S1 | S2g | S1 | S1 | S2rg | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S1 | |
| Bikanahalli | 4 | S2rg | S2g | S2g | S2g | S2g | S2t | S2rg | S2g | S2gt | S2g | S2g | S1 | S2g | S1 | S1 | S2rg | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S1 | |
| Bikanahalli | 5 | S2rg | S2g | S2g | S2g | S2g | S2t | S2rg | S2g | S2gt | S2g | S2g | S1 | S2g | S1 | S1 | S2rg | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S1 | |
| Bikanahalli | 6 | S2rg | S2g | S2g | S2g | S2g | S2t | S2rg | S2g | S2gt | S2g | S2g | S1 | S2g | S1 | S1 | S2rg | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S1 | |
| Bikanahalli | 7 | S2rg | S2g | S2g | S2g | S2g | S2t | S2rg | S2g | S2gt | S2g | S2g | S1 | S2g | S1 | S1 | S2rg | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S1 | |
| Bikanahalli | 8 | S2rg | S2g | S2g | S2g | S2g | S2t | S2rg | S2g | S2gt | S2g | S2g | S1 | S2g | S1 | S1 | S2rg | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S1 | |
| Bikanahalli | 9 | S2rg | S2g | S2g | S2g | S2g | S2t | S2rg | S2g | S2gt | S2g | S2g | S1 | S2g | S1 | S1 | S2rg | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S1 | |
| Bikanahalli | 10 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2gt | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | S2g | |
| Bikanahalli | 11 | S3t | S2t | S3t | S1 | S3t | S1 | S2t | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2t | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S3t | S3t | S2t | S2t | S2t | S2t | S2t | S2t | S2t | S2t | S3t | | |
| Bikanahalli | 12 | S3t | S2t | S3t | S1 | S3t | S1 | S2t | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2t | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S3t | S3t | S2t | S2t | S2t | S2t | S2t | S2t | S2t | S2t | S3t | | |

| Village | Survey Number | Mango | Maize | Sapota | Sorghum | Guava | Cotton | Tamarind | Lime | Bengal gram | Sunflower | Red gram | Amla | Jackfruit | Custard-apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Margold | Chrysanthemum | Pomegranate | Bajra | Jasmine | Bhendi | Brinjal | Crossandra | Drumstick | Mulberry | Onion |
|-------------|---------------|-------|-------|--------|---------|-------|--------|----------|------|-------------|-----------|----------|------|-----------|---------------|--------|-------|---------|-----------|--------|--------|---------|---------------|-------------|-------|---------|--------|---------|------------|-----------|----------|-------|
| Bikanahalli | 13 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 14 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 15 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 16 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 17 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 18 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 19 | S2g | S2tg | S2g | S2g | S2tg | S2g | S2g | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S2tg | S2g | S2g | S3tg | S2tg | S2tg | S2tg | S2tg | S2g | S2g | S2tg | S1 | S1 | S2g | S2g | S2g | S1 |
| Bikanahalli | 20 | S2g | S2tg | S2g | S2g | S2tg | S2g | S2g | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S2tg | S2g | S2g | S3tg | S2tg | S2tg | S2tg | S2tg | S2g | S2g | S2tg | S1 | S1 | S2g | S2g | S2g | S1 |
| Bikanahalli | 21 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 22 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 23 | S2g | S2tg | S2g | S2g | S2tg | S2g | S2g | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S2tg | S2g | S2g | S3tg | S2tg | S2tg | S2tg | S2tg | S2g | S2g | S2tg | S1 | S1 | S2g | S2g | S2g | S1 |
| Bikanahalli | 24 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 25 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 26 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 27 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 28 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2gt | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g |
| Bikanahalli | 29 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2gt | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g |
| Bikanahalli | 34 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 35 | S2r | S1 | S1 | S1 | S1 | S2t | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S2r | S1 | S2t | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 | S1 |
| Bikanahalli | 39 | S2g | S2tg | S2g | S2g | S2tg | S2g | S2g | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S2tg | S2g | S2g | S3tg | S2tg | S2tg | S2tg | S2tg | S2g | S2g | S2tg | S1 | S1 | S2g | S2g | S2g | S1 |
| Bikanahalli | 40 | S2g | S2tg | S2g | S2g | S2tg | S2g | S2g | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S2tg | S2g | S2g | S3tg | S2tg | S2tg | S2tg | S2tg | S2g | S2g | S2tg | S1 | S1 | S2g | S2g | S2g | S1 |
| Bikanahalli | 41 | S2g | S2tg | S2g | S2g | S2tg | S2g | S2g | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S2tg | S2g | S2g | S3tg | S2tg | S2tg | S2tg | S2tg | S2g | S2g | S2tg | S1 | S1 | S2g | S2g | S2g | S1 |
| Bikanahalli | 42 | S2g | S2tg | S2g | S2g | S2tg | S2g | S2g | S2g | S2gt | S2g | S2g | S2g | S2g | S2g | S2tg | S2g | S2g | S3tg | S2tg | S2tg | S2tg | S2tg | S2g | S2g | S2tg | S1 | S1 | S2g | S2g | S2g | S1 |
| Bikanahalli | 63 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t |
| Bikanahalli | 71 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t |
| Bikanahalli | 72 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t |

| Village | Survey Number | Mango | Maize | Sapota | Sorghum | Guava | Cotton | Tamarind | Lime | Bengal gram | Sunflower | Red gram | Amla | Jackfruit | Custard-apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Marrigold | Chrysanthemum | Pomegranate | Bajra | Jasmine | Bhendi | Brinjal | Crossandra | Drumstick | Mulberry | Onion | |
|-------------|---------------|-------|-------|--------|---------|-------|--------|----------|------|-------------|-----------|----------|------|-----------|---------------|--------|-------|---------|-----------|--------|--------|-----------|---------------|-------------|-------|---------|--------|---------|------------|-----------|----------|-------|------|
| Bikanahalli | 73 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Bikanahalli | 74 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Bikanahalli | 75 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Bikanahalli | 76 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Bikanahalli | 77 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Bikanahalli | 78 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | |
| Bikanahalli | 79 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | |
| Bikanahalli | 82 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Bikanahalli | 83 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | |
| Bikanahalli | 84 | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S2rg | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2tg | S2tg | S3g | S3g | S2g | S2g | |
| Bikanahalli | 85 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2gt | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | |
| Bikanahalli | 86 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 87 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 88 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 89 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 90 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg | |
| Bikanahalli | 91 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2gt | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | |
| Bikanahalli | 92 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2gt | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | |
| Bikanahalli | 93 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | |
| Bikanahalli | 94 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | |
| Bikanahalli | 95 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | |
| Bikanahalli | 96 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | |
| Bikanahalli | 97 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | |
| Bikanahalli | 98 | S3rg | S3g | S3g | S3g | S3g | S3g | S3rg | S3g | S3g | S3g | S3g | S2g | S3g | S2g | S3g | S3g | S3g | S2g | S3g | S3g | S3g | S3g | S3g | S3g | S3g | S2g | S2g | S3g | S2g | S2g | S2g | |
| Bikanahalli | 99 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |
| Bikanahalli | 100 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t | |

| Village | Survey Number | Mango | Maize | Sapota | Sorghum | Guava | Cotton | Tamarind | Lime | Bengal gram | Sunflower | Red gram | Amla | Jackfruit | Custard-apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Margold | Chrysanthemum | Pomegranate | Bajra | Jasmine | Bhendi | Brinjal | Crossandra | Drumstick | Mulberry | Onion |
|-------------|---------------|-------|-------|--------|---------|-------|--------|----------|------|-------------|-----------|----------|------|-----------|---------------|--------|-------|---------|-----------|--------|--------|---------|---------------|-------------|-------|---------|--------|---------|------------|-----------|----------|-------|
| Bikanahalli | 101 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |
| Bikanahalli | 102 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |
| Bikanahalli | 103 | S3rz | S2tz | S3tz | S2nz | S3tz | S2rz | S3rz | S2rz | S2rz | S2rz | S3rz | S2tz | S3tz | S2z | N1tz | S3rz | S2rz | S3tz | S3tz | S3tz | S2tz | S2tz | S2rt | S2tz | S3tz | S2tz | S2tz | S2z | S2rz | S2tz | S3tz |
| Bikanahalli | 104 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |
| Bikanahalli | 105 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t |
| Bikanahalli | 106 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t |
| Bikanahalli | 107 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t |
| Bikanahalli | 108 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t |
| Bikanahalli | 109 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t |
| Bikanahalli | 111 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t |
| Bikanahalli | 162 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t |
| Bikanahalli | 163 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t |
| Bikanahalli | 164 | S3rt | S2tz | S3rt | S1 | S3t | S1 | S3r | S2r | S1 | S2r | S2t | S2t | S3t | S1 | N1t | S3rt | S2r | S3t | S3t | S3tw | S2tw | S2tw | S2rt | S2t | S3tw | S2tz | S2tz | S3t | S2rt | S2tw | S3tz |
| Bikanahalli | 165 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |
| Bikanahalli | 166 | S3rt | S2tz | S3rt | S1 | S3t | S1 | S3r | S2r | S1 | S2r | S2t | S2t | S3t | S1 | N1t | S3rt | S2r | S3t | S3t | S3tw | S2tw | S2tw | S2rt | S2t | S3tw | S2tz | S2tz | S3t | S2rt | S2tw | S3tz |
| Bikanahalli | 167 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |
| Bikanahalli | 168 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |
| Bikanahalli | 169 | S3t | S2t | S3t | S1 | S3t | S1 | S2r | S1 | S1 | S1 | S2t | S2t | S3t | S1 | N1t | S2rt | S1 | S3t | S3t | S3t | S2t | S2t | S2t | S2t | S3t | S2t | S2t | S3t | S2t | S2t | S3t |
| Bikanahalli | 170/ 172 | S3rz | S2tz | S3tz | S2nz | S3tz | S2rz | S3rz | S2rz | S2rz | S2rz | S3rz | S2tz | S3tz | S2z | N1tz | S3rz | S2rz | S3tz | S3tz | S3tz | S2tz | S2tz | S2rt | S2tz | S3tz | S2tz | S2tz | S2z | S2rz | S2tz | S3tz |
| Bikanahalli | 171 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |
| Bikanahalli | 173 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |
| Bikanahalli | 174 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |
| Bikanahalli | 175 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |
| Bikanahalli | 176 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |
| Bikanahalli | 177 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |
| Bikanahalli | 178 | N1rt | S3tz | N1rz | S3rz | N1rt | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3tz | N1rt | S3zg | N1rt | N1rt | N1rz | S3tz | S3rz | S3rz | S3rz | S3rz | N1rz | S3rz | S3rz | S3r | S3r | S3rz | N1rz | N1rz | S3rt |

| Village | Survey Number | Mango | Maize | Sapota | Sorghum | Guava | Cotton | Tamarind | Lime | Bengal gram | Sunflower | Red gram | Amla | Jackfruit | Custard-apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Marigold | Chrysanthemum | Pomegranate | Bajra | Jasmine | Bhendi | Brinjal | Crossandra | Drumstick | Mulberry | Onion |
|-------------|---------------|-------|-------|--------|---------|-------|--------|----------|------|-------------|-----------|----------|------|-----------|---------------|--------|-------|---------|-----------|--------|--------|----------|---------------|-------------|-------|---------|--------|---------|------------|-----------|----------|-------|
| Bikanahalli | 179 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 180 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 181 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 182 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 183 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 184 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 185 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 186 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 187 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |
| Bikanahalli | 188 | S2rg | S2g | S2g | S2g | S2g | S2t | S2rg | S2g | S2gt | S2g | S2g | S1 | S2g | S1 | S1 | S2rg | S2g | S2gt | S2g | S2g | S2g | S2g | S1 | S1 | S2g | S1 | S1 | S2g | S1 | S1 | S1 |
| Bikanahalli | 189 | N1rg | S3rg | N1rg | S3rg | N1rg | S3rt | N1rg | N1rg | S3rt | N1rg | N1rg | S3rg | N1rg | S3rg | N1rg | N1rg | N1rg | S3rg | S3rg | S3rg | S3rg | N1rg | S3rg | S3rg | S3rg | S3rg | S3rg | S3rg | N1rg | N1rg | S3rg |

PART-B

SOCIO-ECONOMIC STATUS OF FARM HOUSEHOLDS

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SALIENT FINDINGS OF THE SURVEY

- ❖ *The data indicated that there were 131 (59.01%) men and 91 (40.99%) women among the sampled households.*
- ❖ *The average family size of landless farmers' was 4.8, marginal farmers' was 4.3, small farmers' was 5.27, semi medium farmers' was 5, medium farmers' was 7.33 and large farmers' was 6.*
- ❖ *The data indicated that, 42 (18.92%) people were in 0-15 years of age, 95 (42.79%) were in 16-35 years of age, 64 (28.83%) were in 36-60 years of age and 21 (9.46%) were above 61 years of age.*
- ❖ *The results indicated that Bikkanahalli had 23.87 per cent illiterates, 25.68 per cent of them had primary school education, 6.76 per cent of them had middle school education, 16.67 per cent of them had high school education, 9.91 per cent of them had PUC education, 0.90 per cent had diploma, 4.50 per cent of them did ITI, 9.46 per cent of them had degree education and 0.45 per cent did masters.*
- ❖ *The results indicate that, 82.22 per cent of households were practicing agriculture and 17.78 per cent of the households were agricultural labourers.*
- ❖ *The results indicate that agriculture was the major occupation for 42.34 per cent of the household members, 22.97 per cent were agricultural laborers, 0.90 per cent of the households general labourers, 0.90 per cent of the households were in government service, 1.35 per cent were in private service, 27.48 per cent were students and 1.80 per cent were children.*
- ❖ *The results show that 98.65 per cent of the population in the micro watershed has not participated in any local institutions, 0.45 per cent of the population participated in sthree shakthi sangha and 0.90 per cent participated in self help group.*
- ❖ *The results indicate that 4.44 per cent of the households possess thatched house, 84.44 per cent of the households possess Katcha house and 11.11 per cent of the households possess pucca/RCC house.*
- ❖ *The results show that 4.44 per cent of the households possess radio, 75.56 per cent of the households possess TV, 24.44 per cent of the households possess Mixer grinder, 6.67 per cent of the households possess bicycle, 28.89 per cent of the households possess motor cycle, 2.22 per cent of the households possess landline phone and 95.56 per cent of the households possess mobile phones.*
- ❖ *The results show that the average value of radio was Rs.750, television was Rs.5426, mixer grinder was Rs.1290, bicycle was Rs. 866, motor cycle was Rs.31307, landline phone was Rs.1250 and mobile phone was Rs.2281.*
- ❖ *About 22.22 per cent of the households possess bullock cart, 8.89 per cent of the households possess plough, 2.22 per cent of them possess seed/fertilizer drill, 2.22 per cent of them possess tractor, 2.22 per cent of them possess sprayer and 20 per cent of them possess weeder.*

- ❖ *The results show that the average value of bullock cart was Rs.22400, the average value of plough was Rs.2250, the average value of seed/fertilizer drill was Rs.3000, the average value of tractor was Rs.300000, the average value of sprayer was Rs.2000 and the average value of weeder was Rs.50.*
- ❖ *The results indicate that, 22.22 per cent of the households possess bullocks, 11.11 per cent of the households possess local cow, 6.67 per cent of them possess buffalo and 2.22 per cent of the households possess poultry birds.*
- ❖ *The results indicate that, average own labour men available in the micro watershed was 1.93, average own labour (women) available was 1.23, average hired labour (men) available was 7.55 and average hired labour (women) available was 7.38.*
- ❖ *The results indicate that, 62.22 per cent of the households opined that the hired labour was adequate and 24.44 per cent of the households opined that the hired labour was inadequate.*
- ❖ *The results indicate that, households of the Bikkanahalli micro-watershed possess 73.47 ha (89.81%) of dry land and 8.34 ha (10.19%) of irrigated land. Marginal farmers possess 12.10 ha (96.76%) of dry land and 0.40 ha (3.24%) of irrigated land. Small farmers possess 17.42 ha (100%) of dry land. Semi medium farmers possess 6.48 ha (65.04%) of dry land and 3.48 per cent (34.96%) of irrigated land. Medium farmers possess 9.15 ha (67.26%) of dry land and 4.45 ha (32.74%) of irrigated land; large farmers possess 28.33 ha (100%) of dry land.*
- ❖ *The results indicate that, the average value of dry land was Rs. 151,492.43 and average value of irrigated land was Rs. 389,684.47. In case of marginal famers, the average land value was Rs. 417,034.44 for dry land and Rs. 1,235,000 for irrigated land. In case of small famers, the average land value was Rs. 225,823.66 for dry land. In case of semi medium famers, the average land value was Rs. 192,968.75 for dry land and Rs. 545,697.68 for irrigated land. In case of medium famers, the average land value was Rs. 65,575.22 for dry land and Rs. 190,863.64 for irrigated land and in case of large farmers it was Rs. 10,585.71 for dry land.*
- ❖ *The results indicate that, there were 8 functioning and 5 de-functioning bore wells in the micro watershed.*
- ❖ *The results indicate that, bore well was the major irrigation source in the micro water shed for 17.78 per cent of the farmers.*
- ❖ *The results indicate that, the depth of bore well was found to be 14.09 meters.*
- ❖ *The results indicate that, marginal, semi medium and medium farmers had irrigated area of 1.21 ha, 3.08 ha and 4.45 ha respectively.*
- ❖ *The results indicate that, farmers have grown maize (21.98 ha), bajra (6.30 ha), sunflower (6.73 ha), Bengal gram (1.42 ha), sorghum (8.42 ha), redgram (1.82 ha), navane (1.01), blackgram (0.40), Greengram (0.81), horsegram (0.81), onion (0.40) and chilly (0.65 ha).*

- ❖ *The results indicate that, the cropping intensity in Bikkanahalli micro-watershed was found to be 66.07 per cent. In case of marginal farmers it was 86.40 per cent, small farmers it was 76.21 per cent, in case of semi medium farmers it was 81.46, medium farmers it was 45.35 per cent and in case of large farmers it was 100 per cent.*
- ❖ *The results indicate that, 75.56 per cent of the households have bank account and 24.44 per cent have savings.*
- ❖ *The results indicate that, 44.44 per cent of the households have availed credit from different sources.*
- ❖ *The results indicate that, the total cost of cultivation for maize was Rs. 46549.67. The gross income realized by the farmers was Rs. 33923.77. The net income from Maize cultivation was Rs. -12625.90, thus the benefit cost ratio was found to be 1:0.73.*
- ❖ *The total cost of cultivation for redgram was Rs. 36636.55. The gross income realized by the farmers was Rs. 4763.57. The net income from redgram cultivation was Rs. -31872.97. Thus the benefit cost ratio was found to be 1:0.13.*
- ❖ *The total cost of cultivation for bajra was Rs. 31736.21. The gross income realized by the farmers was Rs. 18149.41. The net income from bajra cultivation was Rs. -13586.80. Thus the benefit cost ratio was found to be 1:0.57.*
- ❖ *The total cost of cultivation for Green gram was Rs. 20029.78. The gross income realized by the farmers was Rs. 7410. The net income from Green gram cultivation was Rs. -12619.78. Thus the benefit cost ratio was found to be 1:0.37.*
- ❖ *The total cost of cultivation for chilly was Rs. 30931.31. The gross income realized by the farmers was Rs. 27787.50. The net income from chilly cultivation was Rs. -3143.81. Thus the benefit cost ratio was found to be 1:0.9.*
- ❖ *The total cost of cultivation for sunflower was Rs. 37640.24. The gross income realized by the farmers was Rs. 22297.69. The net income from sunflower cultivation was Rs. -15342.56. Thus the benefit cost ratio was found to be 1:0.59.*
- ❖ *The total cost of cultivation for bengal gram was Rs. 49117.08. The gross income realized by the farmers was Rs. 25214.58. The net income from bengal gram cultivation was Rs. -23902.50. Thus the benefit cost ratio was found to be 1:0.51.*
- ❖ *The total cost of cultivation for sorghum was Rs. 25990.03. The gross income realized by the farmers was Rs. 17599.03. The net income from sorghum cultivation was Rs. -8391.01. Thus the benefit cost ratio was found to be 1:0.68.*
- ❖ *The total cost of cultivation for navane was Rs. 22542.34. The gross income realized by the farmers was Rs. 8892. The net income from navane cultivation was Rs. -13650.34. Thus the benefit cost ratio was found to be 1:0.39.*
- ❖ *The total cost of cultivation for blackgram was Rs. 29957.73. The gross income realized by the farmers was Rs. 25935. The net income from blackgram cultivation was Rs. -4022.73. Thus the benefit cost ratio was found to be 1:0.87.*

- ❖ *The total cost of cultivation for horsegram was Rs. 34435.29. The gross income realized by the farmers was Rs. 6669. The net income from horsegram cultivation was Rs. -27766.29. Thus the benefit cost ratio was found to be 1:0.19.*
- ❖ *The total cost of cultivation for onion was Rs. 89144.62. The gross income realized by the farmers was Rs. 29640. The net income from onion cultivation was Rs. -59504.62. Thus the benefit cost ratio was found to be 1:0.33.*
- ❖ *The results indicate that, 28.89 per cent of the households opined that dry fodder was adequate and 2.22 per cent opined that dry fodder was inadequate.*
- ❖ *The results indicate that the average annual gross income was Rs. 27,000 for landless farmers, for marginal farmers it was Rs. 43,955.79, for small farmers it was Rs. 40,545.45, for semi medium farmers it was Rs. 135,300, for medium farmers it was Rs. 170,333.33 and for large farmers it was Rs. 25,000.*
- ❖ *The results indicate that the average annual expenditure is Rs. 5,601.85. For landless households it was Rs. 1,500, for marginal farmers it was Rs. 1,820.18, for small farmers it was Rs. 2,727.27, for semi medium farmers it was Rs. 9,111.11, for medium farmers it was Rs. 30,111.11 and for large farmers it was Rs. 35,000.*
- ❖ *The results indicate that, the average additional investment capacity with the households for land development was Rs. 2933.33, for improved crop production Rs.1822.22 and for improved livestock management Rs. 1066.67.*
- ❖ *The results indicate that, government subsidy was the source of additional investment capacity for 7.5 per cent for irrigation facility and 2.5 per cent for improved livestock management.*
- ❖ *The results indicate that, loan from bank was the source of additional investment capacity for 22.22 per cent for land development, for another 22.22 per cent for improved crop production and 13.33 per cent for improved livestock management. Own funds were the source of additional investment for 13.33 per cent for land development and 8.89 per cent for improved crop production. Soft loan was the source of additional investment capacity for 2.22 per cent for land development, for 6.67 per cent for improved crop production and for 6.67 per cent for improved livestock management.*
- ❖ *The results indicated that, all crops were sold to the extent of 100 per cent except blackgram (66.67), sorghum (96.94%) and sunflower (98.41%).*
- ❖ *The results indicated that, about 46.67 per cent of the famers have sold their produce in regulated markets, 77.78 per cent of the farmers have sold to local/village merchants and 2.22 per cent have sold their produce to cooperative marketing society.*
- ❖ *The results indicated that, 122.22 per cent of the households have used tractor as a mode of transportation for their agricultural produce and 2.22 per cent have used truck as a mode of transport for their agricultural produce.*

- ❖ *The results indicated that, 86.67 per cent of the households have experienced soil and water erosion problems in the farm i.e., 89.47 per cent of the marginal farmers, 100 per cent of the small farmers, 100 per cent of semi medium, 100 per cent of medium and large farmers have experienced soil and water erosion problems.*
- ❖ *The results indicated that, 80 per cent have shown interest in soil test i.e 94.74 per cent of marginal, 90.91 per cent of small, 66.67 per cent of semi medium, 100 per cent of medium and large farmers.*
- ❖ *The results indicated that, 84.44 per cent of the households used firewood and 17.78 per cent used LPG as a source of fuel.*
- ❖ *The results indicated that, bore well was the major source of drinking water for 28.89 per cent of the households, piped supply was the source of drinking water for 60 per cent of the households and lake/tank was the major source of drinking water for 4.44 per cent of the households and canal/nala was the source of drinking water for 2.22 per cent of the households in the micro watershed.*
- ❖ *Electricity was the major source of light for 100 per cent of the households in micro watershed.*
- ❖ *The results indicated that, 42.22 per cent of the households possess sanitary toilet i.e. 21.05 per cent of the marginal farmers, 36.36 per cent of the small farmers, 33.33 per cent of the semi medium farmers, 100 per cent of the landless, medium and large farmers.*
- ❖ *The results indicated that, 95.56 per cent of the sampled households possessed BPL card, 4.44 per cent of the households possessed APL card and 2.22 per cent of the households did not possess PDS card.*
- ❖ *The results indicated that, 42.22 per cent of the households participated in NREGA programme.*
- ❖ *The results indicated that, cereals were adequate for 91.11 per cent of the households, pulses were adequate for 51.11 per cent, oilseeds were adequate for 11.11 per cent, vegetables were adequate for 46.67 per cent, fruits were adequate for 6.67 per cent, milk was adequate for 57.78 per cent, eggs were adequate for 31.11 per cent and meat was adequate for 20 per cent.*
- ❖ *The results indicated that, cereals were inadequate for 8.89 per cent of the households, pulses were inadequate for 48.89 per cent of the households, oilseeds were inadequate for 84.44 per cent, vegetables were inadequate for 44.44 per cent, fruits were inadequate for 77.78 per cent, milk was inadequate for 31.11 per cent, eggs were inadequate for 62.22 per cent and meat was inadequate for 51.11 per cent of the households.*
- ❖ *The results indicated that, oilseeds were market surplus for 2.22 per cent, fruits were market surplus for 11.11 per cent and milk was market surplus for 2.22 per cent of the households.*

❖ *The results indicated that, lower fertility status of the soil was the constraint experienced by 84.44 per cent of the households, wild animal menace on farm field (71.11%), frequent incidence of pest and diseases (46.67%), inadequacy of irrigation water (13.33%), high cost of fertilizers and plant protection chemicals (35.56%), high rate of interest on credit (40%), low price for the agricultural commodities (51.11%), lack of marketing facilities in the area (57.78%), lack of transport for safe transport of the agricultural produce to the market (80%), inadequate extension services (24.44%), less rainfall (22.22%) and source of agri-technology information (17.78%).*

INTRODUCTION

Soil and water are the two precious natural resources which are essential for crop production and existence of life on earth. Rainfed agriculture is under severe stress due to various constraints related to agriculture like uneven and erratic distribution of rainfall, indiscriminate use of fertilizers, chemicals and pesticides, adoption of improper land management practices, soil erosion, decline in soil fertility, decline in ground water resources leading to low crop productivity. The area under rainfed agriculture has to be managed effectively using the best available practices to enhance the production of food, fodder and fuel. This is possible if the land resources are characterized at each parcel of land through detailed land resource inventory using the best available techniques of remote sensing, GPS and GIS. The watershed development programs are aimed at the sustainable distribution of its resources and the process of creating and implementing plans, programs, and projects to sustain and enhance watershed functions that affect the plant, animal and human communities within a watershed boundary.

World Bank funded KWDP II, SUJALA III project was implemented in with Broad objective of demonstrating more effective watershed management through greater integration of programmes related to rain-fed agriculture, innovative and science based approaches and strengthen institutional capacities and If successful, it is expected that the systems and tools could be mainstreamed into the overall IWMP in the State of Karnataka and in time, throughout other IWMP operations in India. With this background the socio-economic survey has been carried out with following specific objectives:

1. To understand the demographic features of the households in the micro-watershed
2. To understand the extent of family labour available and additional employment opportunities available within the village.
3. To know the status of assets of households in the micro-watershed for suggesting possible improvements.
4. To study the cropping pattern, cropped area and productivity levels of different households in micro-watershed.
5. To determine the type and extent of livestock owned by different categories of HHs
6. Availability of fodder and level of livestock management.

Scope and importance of survey

Survey helps in identification of different socio-economic and resource use-patterns of farmers at the Micro watershed. Household survey provides demographic features, labour force, and levels of education; land ownership and asset position (including livestock and other household assets) of surveyed households; and cropping patterns, input intensities, and average crop yields from farmers' fields. It also discusses crop utilization and the degree of commercialization of production in the areas; farmers' access to and utilization of credit from formal and informal sources; and the level of adoption and use of soil, water, and pest management technologies.

METHODOLOGY

The description of the methods, components selected for the survey and procedures followed in conducting the baseline survey are furnished under the following heads.

Description of the study area

Koppal district is an administrative district in the state of Karnataka in India. In the past Koppal was referred to as 'Kopana Nagara'. Koppal, now a district headquarters is ancient Kopana a major holy place of the Jainas. The district occupies an area of 7,190 km² and has a population of 1,196,089, which 16.58% were urban as of 2001. The Koppal district was formed after split of Raichur district.

Geographers are very particular about the physiography or relief of a region. It plays a very important role in the spatial analysis of agricultural situation of the study area. The undulating topography with black cotton soil shrips, cut across by numerous nalas or streams is the major characteristic feature of the study region. Three physiographic divisions have made considering the local conditions of landforms and crops grown in the district. On the basis of physiography, Koppal district can be divided into three major divisions.³ They are (a) Koppal & Yelburga plateau, (b) Maidan division, (c) Tungabhadra valley. The district is part of Krishna basin the main streams draining the area are Maskinala, Ilkal-nadi and Hirenala. These are Ephemeral in nature, these come under Tungabhadra sub-basin. The drainage exhibit dentritic to subdentritic with drainage density varies from 1.4 to 7.0kms/sq.km.

According to the 2011 census Koppal district has a population of 1,391,292, roughly equal to the nation of Swaziland or the US state of Hawaii. This gives it a ranking of 350th in India (out of a total of 640). The district has a population density of 250 inhabitants per square kilometre (650/sq mi). Its population growth rate over the decade 2001-2011 was 16.32%. Koppal has a sex ratio of 983 females for every 1000 males, and a literacy rate of 67.28%.

Description of the micro watershed

Bikkanahalli micro-watershed (Hireshindhogi sub-watershed, Koppal Taluk and District) is located at North latitude 15^o17'4.859" to 15^o15'40.925" and East longitude 76^o4'26.139" to 7^o2'29.94" E covering an area of 547.83 ha and spread across Mynahalli, Bikkanahalli and Bisarahalli villages.

Methodology followed in assessing socio-economic status of households

In order to assess the socio-economic condition of the farmers in the watershed a comprehensive questionnaire was prepared. Major components such as demographic conditions, migration details, food consumption and family expenditure pattern, material possession, land holding, land use management, cropping pattern, cost of cultivation of crops, livestock management. The statistical components such as frequency and percentage were used to analyze the data. About 45 households located in the micro watershed were interviewed for the survey.

SALIENT FEATURES OF THE SURVEY

Households sampled for socio-economic survey: The data on households sampled for socio economic survey in Bikkanahalli micro-watershed is presented in Table 1 and it indicated that 45 farmers were sampled in Bikkanahalli micro-watershed among them 5 (11.11%) were landless, 19 (42.22%) were marginal farmers, 11 (24.44%) were small farmers, 6 (13.33%) were semi medium farmers, 3 (6.67%) was medium farmer and 1 (2.22%) was large farmer.

Table 1: Households sampled for socio economic survey in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|-------|---------|-------|---------|-------|---------|-------|---------|------|--------|------|----------|--------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Farmers | 5 | 11.11 | 19 | 42.22 | 11 | 24.44 | 6 | 13.33 | 3 | 6.67 | 1 | 2.22 | 45 | 100.00 |

Population characteristics: The population characteristics of households sampled for socio-economic survey in Bikkanahalli micro-watershed is presented in Table 2. The data indicated that there were 131 (59.01%) men and 91 (40.99%) women among the sampled households. The average family size of landless farmers' was 4.8, marginal farmers' was 4.3, small farmers' was 5.27, semi medium farmers' was 5, medium farmers' was 7.33 and large farmers' was 6.

Table 2: Population characteristics of Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|--------|---------|--------|---------|--------|---------|--------|---------|--------|--------|--------|----------|--------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Male | 14 | 58.33 | 46 | 56.10 | 37 | 63.79 | 20 | 66.67 | 11 | 50.00 | 3 | 50.00 | 131 | 59.01 |
| 2 | Female | 10 | 41.67 | 36 | 43.90 | 21 | 36.21 | 10 | 33.33 | 11 | 50.00 | 3 | 50.00 | 91 | 40.99 |
| | Total | 24 | 100.00 | 82 | 100.00 | 58 | 100.00 | 30 | 100.00 | 22 | 100.00 | 6 | 100.00 | 222 | 100.00 |
| | Average | 4.8 | | 4.3 | | 5.27 | | 5 | | 7.33 | | 6 | | 4.9 | |

Age wise classification of population: The age wise classification of household members in Bikkanahalli micro-watershed is presented in Table 3. The data indicated that, 42 (18.92%) people were in 0-15 years of age, 95 (42.79%) were in 16-35 years of age, 64 (28.83%) were in 36-60 years of age and 21 (9.46%) were above 61 years of age.

Table 3: Age wise classification of household members in Bikkanahalli micro-watershed

| Sl. No. | Particulars | LL (24) | | MF(82) | | SF (58) | | SMF(30) | | MDF(22) | | LF (6) | | All (222) | |
|---------|--------------------|---------|-------|--------|-------|---------|-------|---------|-------|---------|-------|--------|-------|-----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | 0-15 years of age | 5 | 20.83 | 19 | 23.17 | 9 | 15.52 | 7 | 23.33 | 2 | 9.09 | 0 | 0 | 42 | 18.92 |
| 2 | 16-35 years of age | 10 | 41.67 | 31 | 37.80 | 24 | 41.38 | 12 | 40 | 13 | 59.09 | 5 | 83.33 | 95 | 42.79 |
| 3 | 36-60 years of age | 7 | 29.17 | 24 | 29.27 | 19 | 32.76 | 10 | 33.33 | 3 | 13.64 | 1 | 16.67 | 64 | 28.83 |
| 4 | > 61 years | 2 | 8.33 | 8 | 9.76 | 6 | 10.34 | 1 | 3.33 | 4 | 18.18 | 0 | 0 | 21 | 9.46 |
| | Total | 24 | 100 | 82 | 100 | 58 | 100 | 30 | 100 | 22 | 100 | 6 | 100 | 222 | 100 |

Education level of household members; Education level of household members in Bikkanahalli micro-watershed is presented in Table 4. The results indicated that

Bikkanahalli had 23.87 per cent illiterates, 25.68 per cent of them had primary school education, 6.76 per cent of them had middle school education, 16.67 per cent of them had high school education, 9.91 per cent of them had PUC education, 0.90 per cent had diploma, 4.50 per cent of them did ITI, 9.46 per cent of them had degree education and 0.45 per cent did masters.

Table 4. Education level of household members in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (24) | | MF (82) | | SF (58) | | SMF (30) | | MDF (22) | | LF (6) | | All (222) | |
|--------|----------------|---------|-------|---------|-------|---------|-------|----------|-------|----------|-------|--------|-------|-----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Illiterate | 3 | 12.50 | 18 | 21.95 | 16 | 27.59 | 6 | 20 | 7 | 31.82 | 3 | 50 | 53 | 23.87 |
| 2 | Primary School | 3 | 12.50 | 26 | 31.71 | 12 | 20.69 | 14 | 46.67 | 2 | 9.09 | 0 | 0 | 57 | 25.68 |
| 3 | Middle School | 2 | 8.33 | 5 | 6.10 | 4 | 6.90 | 1 | 3.33 | 1 | 4.55 | 2 | 33.33 | 15 | 6.76 |
| 4 | High School | 7 | 29.17 | 19 | 23.17 | 5 | 8.62 | 4 | 13.33 | 2 | 9.09 | 0 | 0 | 37 | 16.67 |
| 5 | PUC | 4 | 16.67 | 4 | 4.88 | 8 | 13.79 | 2 | 6.67 | 3 | 13.64 | 1 | 16.67 | 22 | 9.91 |
| 6 | Diploma | 0 | 0 | 0 | 0 | 2 | 3.45 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0.90 |
| 7 | ITI | 2 | 8.33 | 3 | 3.66 | 3 | 5.17 | 2 | 6.67 | 0 | 0 | 0 | 0 | 10 | 4.50 |
| 8 | Degree | 0 | 0 | 6 | 7.32 | 7 | 12.07 | 1 | 3.33 | 7 | 31.82 | 0 | 0 | 21 | 9.46 |
| 9 | Masters | 1 | 4.17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.45 |
| 10 | Others | 2 | 8.33 | 1 | 1.22 | 1 | 1.72 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1.80 |
| Total | | 24 | 100 | 82 | 100 | 58 | 100 | 30 | 100 | 22 | 100 | 6 | 100 | 222 | 100 |

Occupation of household heads: The data regarding the occupation of the household heads in Bikkanahalli micro-watershed is presented in Table 5. The results indicate that, 82.22 per cent of households were practicing agriculture and 17.78 per cent of the households were agricultural labourers.

Table 5: Occupation of household heads in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|---------------------|--------|-----|---------|-------|---------|-------|---------|-----|---------|-----|--------|-----|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Agriculture | 0 | 0 | 18 | 94.74 | 9 | 81.82 | 6 | 100 | 3 | 100 | 1 | 100 | 37 | 82.22 |
| 2 | Agricultural Labour | 5 | 100 | 1 | 5.26 | 2 | 18.18 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 17.78 |
| 3 | Others | 0 | 0 | 0 | 0 | 1 | 9.09 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2.22 |
| Total | | 5 | 100 | 19 | 100 | 12 | 100 | 6 | 100 | 3 | 100 | 1 | 100 | 46 | 100 |

Table 6: Occupation of family members in Bikkanahalli micro-watershed

| Sl. No. | Particulars | LL (24) | | MF(82) | | SF (58) | | SMF(30) | | MDF(22) | | LF (6) | | All (222) | |
|---------|---------------------|---------|-------|--------|-------|---------|-------|---------|-------|---------|-------|--------|-------|-----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Agriculture | 0 | 0 | 44 | 53.66 | 26 | 44.83 | 10 | 33.33 | 11 | 50 | 3 | 50 | 94 | 42.34 |
| 2 | Agricultural Labour | 16 | 66.67 | 12 | 14.63 | 8 | 13.79 | 11 | 36.67 | 3 | 13.64 | 1 | 16.67 | 51 | 22.97 |
| 3 | General Labour | 0 | 0 | 1 | 1.22 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 16.67 | 2 | 0.90 |
| 6 | Government Service | 1 | 4.17 | 0 | 0 | 1 | 1.72 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0.90 |
| 7 | Private Service | 0 | 0 | 0 | 0 | 3 | 5.17 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1.35 |
| 10 | Student | 5 | 20.83 | 22 | 26.83 | 16 | 27.59 | 9 | 30 | 8 | 36.36 | 1 | 16.67 | 61 | 27.48 |
| 11 | Others | 0 | 0 | 2 | 2.44 | 3 | 5.17 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2.25 |
| 13 | Children | 2 | 8.33 | 1 | 1.22 | 1 | 1.72 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1.80 |
| Total | | 24 | 100 | 82 | 100 | 58 | 100 | 30 | 100 | 22 | 100 | 6 | 100 | 222 | 100 |

Occupation of the household members: The data regarding the occupation of the household members in Bikkanahalli micro-watershed is presented in Table 6. The results

indicate that agriculture was the major occupation for 42.34 per cent of the household members, 22.97 per cent were agricultural laborers, 0.90 per cent of the households general labourers, 0.90 per cent of the households were in government service, 1.35 per cent were in private service, 27.48 per cent were students and 1.80 per cent were children.

Institutional participation of the household members: The data regarding the institutional participation of the household members in Bikkanahalli micro-watershed is presented in Table 7. The results show that 98.65 per cent of the population in the micro watershed has not participated in any local institutions, 0.45 per cent of the population participated in sthree shakthi sangha and 0.90 per cent participated in self help group.

Table 7. Institutional Participation of household members in Bikkanahalli micro-watershed

| Sl. No. | Particulars | LL(24) | | MF(82) | | SF (58) | | SMF(30) | | MDF(22) | | LF(6) | | All (222) | |
|---------|-----------------------|--------|-----|--------|-------|---------|-------|---------|-----|---------|-----|-------|-----|-----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Sthree Shakthi Sangha | 0 | 0 | 1 | 1.22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.45 |
| 2 | Self Help Group | 0 | 0 | 0 | 0 | 2 | 3.45 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0.90 |
| 3 | No Participation | 24 | 100 | 81 | 98.78 | 56 | 96.55 | 30 | 100 | 22 | 100 | 6 | 100 | 219 | 98.65 |
| Total | | 24 | 100 | 82 | 100 | 58 | 100 | 30 | 100 | 22 | 100 | 6 | 100 | 222 | 100 |

Type of house owned: The data regarding the type of house owned by the households in Bikkanahalli micro-watershed is presented in Table 8. The results indicate that 4.44 per cent of the households possess thatched house, 84.44 per cent of the households possess Katcha house and 11.11 per cent of the households possess pucca/RCC house.

Table 8. Type of house owned by households in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|--------|---------|--------|---------|--------|---------|--------|---------|--------|--------|--------|----------|--------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Thatched | 0 | 0.00 | 2 | 10.53 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 4.44 |
| 2 | Katcha | 3 | 60.00 | 15 | 78.95 | 11 | 100.00 | 5 | 83.33 | 3 | 100.00 | 1 | 100.00 | 38 | 84.44 |
| 3 | Pucca/RCC | 2 | 40.00 | 2 | 10.53 | 0 | 0.00 | 1 | 16.67 | 0 | 0.00 | 0 | 0.00 | 5 | 11.11 |
| Total | | 5 | 100.00 | 19 | 100.00 | 11 | 100.00 | 6 | 100.00 | 3 | 100.00 | 1 | 100.00 | 45 | 100.00 |

Table 9. Durable Assets owned by households in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|----------------|--------|--------|---------|-------|---------|--------|---------|--------|---------|--------|--------|--------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Radio | 0 | 0.00 | 1 | 5.26 | 0 | 0.00 | 0 | 0.00 | 1 | 33.33 | 0 | 0.00 | 2 | 4.44 |
| 2 | Television | 3 | 60.00 | 15 | 78.95 | 7 | 63.64 | 6 | 100.00 | 3 | 100.00 | 0 | 0.00 | 34 | 75.56 |
| 3 | Mixer/Grinder | 0 | 0.00 | 3 | 15.79 | 1 | 9.09 | 4 | 66.67 | 3 | 100.00 | 0 | 0.00 | 11 | 24.44 |
| 4 | Bicycle | 0 | 0.00 | 2 | 10.53 | 0 | 0.00 | 1 | 16.67 | 0 | 0.00 | 0 | 0.00 | 3 | 6.67 |
| 5 | Motor Cycle | 2 | 40.00 | 5 | 26.32 | 1 | 9.09 | 4 | 66.67 | 1 | 33.33 | 0 | 0.00 | 13 | 28.89 |
| 6 | Landline Phone | 0 | 0.00 | 1 | 5.26 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.22 |
| 7 | Mobile Phone | 5 | 100.00 | 17 | 89.47 | 11 | 100.00 | 6 | 100.00 | 3 | 100.00 | 1 | 100.00 | 43 | 95.56 |

Durable Assets owned by the households: The data regarding the Durable Assets owned by the households in Bikkanahalli micro-watershed is presented in Table 9. The results show that 4.44 per cent of the households possess radio, 75.56 per cent of the households possess TV, 24.44 per cent of the households possess Mixer grinder, 6.67 per

cent of the households possess bicycle, 28.89 per cent of the households possess motor cycle, 2.22 per cent of the households possess landline phone and 95.56 per cent of the households possess mobile phones.

Average value of durable assets: The data regarding the average value of durable assets owned by the households in Bikkanahalli micro-watershed is presented in Table 10. The results show that the average value of radio was Rs.750, television was Rs.5426, mixer grinder was Rs.1290, bicycle was Rs. 866, motor cycle was Rs.31307, landline phone was Rs.1250 and mobile phone was Rs.2281.

Table 10. Average value of durable assets owned by households in Bikkanahalli micro-watershed
Average value (Rs.)

| Sl.No. | Particulars | LL (5) | MF (19) | SF (11) | SMF (6) | MDF (3) | LF (1) | All (45) |
|--------|----------------|-----------|-----------|-----------|-----------|-----------|----------|-----------|
| 1 | Radio | 0.00 | 500.00 | 0.00 | 0.00 | 1,000.00 | 0.00 | 750.00 |
| 2 | Television | 4,333.00 | 5,700.00 | 6,142.00 | 4,000.00 | 6,333.00 | 0.00 | 5,426.00 |
| 3 | Mixer/Grinder | 0.00 | 1,300.00 | 1,000.00 | 1,075.00 | 1,666.00 | 0.00 | 1,290.00 |
| 4 | Bicycle | 0.00 | 800.00 | 0.00 | 1,000.00 | 0.00 | 0.00 | 866.00 |
| 5 | Motor Cycle | 23,000.00 | 32,200.00 | 40,000.00 | 31,250.00 | 35,000.00 | 0.00 | 31,307.00 |
| 6 | Landline Phone | 0.00 | 1,250.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,250.00 |
| 7 | Mobile Phone | 4,166.00 | 2,795.00 | 1,812.00 | 2,171.00 | 1,000.00 | 1,000.00 | 2,366.00 |

Farm Implements owned: The data regarding the farm implements owned by the households in Bikkanahalli micro-watershed is presented in Table 11. About 22.22 per cent of the households possess bullock cart, 8.89 per cent of the households possess plough, 2.22 per cent of them possess seed/fertilizer drill, 2.22 per cent of them possess tractor, 2.22 per cent of them possess sprayer and 20 per cent of them possess weeder.

Table 11. Farm Implements owned by households in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-----------------------|--------|--------|---------|-------|---------|-------|---------|-------|---------|-------|--------|--------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Bullock Cart | 0 | 0.00 | 1 | 5.26 | 3 | 27.27 | 4 | 66.67 | 2 | 66.67 | 0 | 0.00 | 10 | 22.22 |
| 2 | Plough | 0 | 0.00 | 1 | 5.26 | 0 | 0.00 | 2 | 33.33 | 1 | 33.33 | 0 | 0.00 | 4 | 8.89 |
| 3 | Seed/Fertilizer Drill | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 16.67 | 0 | 0.00 | 0 | 0.00 | 1 | 2.22 |
| 4 | Tractor | 0 | 0.00 | 1 | 5.26 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.22 |
| 5 | Sprayer | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 16.67 | 0 | 0.00 | 0 | 0.00 | 1 | 2.22 |
| 6 | Weeder | 0 | 0.00 | 3 | 15.79 | 3 | 27.27 | 1 | 16.67 | 1 | 33.33 | 1 | 100.00 | 9 | 20.00 |
| 7 | Blank | 5 | 100.00 | 15 | 78.95 | 8 | 72.73 | 2 | 33.33 | 1 | 33.33 | 0 | 0.00 | 31 | 68.89 |

Table 12. Average value of farm implements owned by households in Bikkanahalli micro-watershed
Average Value (Rs.)

| Sl.No. | Particulars | MF (19) | SF (11) | SMF (6) | MDF (3) | LF (1) | All (45) |
|--------|-----------------------|------------|-----------|-----------|-----------|--------|------------|
| 1 | Bullock Cart | 40,000.00 | 21,666.00 | 16,000.00 | 27,500.00 | 0.00 | 22,400.00 |
| 2 | Plough | 2,000.00 | 0.00 | 2,500.00 | 2,000.00 | 0.00 | 2,250.00 |
| 3 | Seed/Fertilizer Drill | 0.00 | 0.00 | 3,000.00 | 0.00 | 0.00 | 3,000.00 |
| 4 | Tractor | 300,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 300,000.00 |
| 5 | Sprayer | 0.00 | 0.00 | 2,000.00 | 0.00 | 0.00 | 2,000.00 |
| 6 | Weeder | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 |

Average value of farm implements: The data regarding the average value of farm Implements owned by the households in Bikkanahalli micro-watershed is presented in

Table 12. The results show that the average value of bullock cart was Rs.22400, the average value of plough was Rs.2250, the average value of seed/fertilizer drill was Rs.3000, the average value of tractor was Rs.300000, the average value of sprayer was Rs.2000 and the average value of weeder was Rs.50.

Livestock possession by the households: The data regarding the Livestock possession by the households in Bikkanahalli micro-watershed is presented in Table 13. The results indicate that, 22.22 per cent of the households possess bullocks, 11.11 per cent of the households possess local cow, 6.67 per cent of them possess buffalo and 2.22 per cent of the households possess poultry birds.

Table 13. Livestock possession by households in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|---------------|--------|--------|---------|-------|---------|-------|---------|-------|---------|-------|--------|--------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Bullock | 0 | 0.00 | 1 | 5.26 | 3 | 27.27 | 4 | 66.67 | 2 | 66.67 | 0 | 0.00 | 10 | 22.22 |
| 2 | Local cow | 0 | 0.00 | 3 | 15.79 | 0 | 0.00 | 2 | 33.33 | 0 | 0.00 | 0 | 0.00 | 5 | 11.11 |
| 3 | Buffalo | 0 | 0.00 | 2 | 10.53 | 0 | 0.00 | 1 | 16.67 | 0 | 0.00 | 0 | 0.00 | 3 | 6.67 |
| 4 | Poultry birds | 0 | 0.00 | 1 | 5.26 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.22 |
| 5 | blank | 5 | 100.00 | 12 | 63.16 | 8 | 72.73 | 1 | 16.67 | 1 | 33.33 | 1 | 100.00 | 28 | 62.22 |

Average Labour availability: The data regarding the average labour availability in Bikkanahalli micro-watershed is presented in Table 14. The results indicate that, average own labour men available in the micro watershed was 1.93, average own labour (women) available was 1.23, average hired labour (men) available was 7.55 and average hired labour (women) available was 7.38.

In case of marginal farmers, average own labour men available was 1.58, average own labour (women) was 1.16, average hired labour (men) was 6.21 and average hired labour (women) available was 5.79. In case of small farmers, average own labour men available was 2, average own labour (women) was 1.27, average hired labour (men) was 9.36 and average hired labour (women) available was 9.18. In case of semi medium farmers, average own labour men available was 2.50, average own labour (women) was 1.33, average hired labour (men) was 7.17 and average hired labour (women) available was 7.67. In case of medium farmers, average own labour men available was 2.67, average own labour (women) was 1.33, average hired labour (men) was 12.67 and average hired labour (women) available was 12.67. In case of large farmers, average own labour men available was 2 and average own labour (women) was 1.

Table 14. Average Labour availability in Bikkanahalli micro-watershed

| Sl.No. | Particulars | MF (19) | SF (11) | SMF (6) | MDF (3) | LF (1) | All (45) |
|--------|---------------------|---------|---------|---------|---------|--------|----------|
| | | N | N | N | N | N | N |
| 1 | Hired labour Female | 5.79 | 9.18 | 7.67 | 12.67 | 0.00 | 7.38 |
| 2 | Hired labour Male | 6.21 | 9.36 | 7.17 | 12.67 | 0.00 | 7.55 |
| 3 | Own Labour Female | 1.16 | 1.27 | 1.33 | 1.33 | 1.00 | 1.23 |
| 4 | Own labour Male | 1.58 | 2.00 | 2.50 | 2.67 | 2.00 | 1.93 |

Adequacy of Hired Labour: The data regarding the adequacy of hired labour in Bikkanahalli micro-watershed is presented in Table 15. The results indicate that, 62.22 per cent of the households opined that the hired labour was adequate and 24.44 per cent of the households opined that the hired labour was inadequate.

Table 15. Adequacy of Hired Labour in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|------|---------|-------|---------|-------|---------|-------|---------|-------|--------|--------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Adequate | 0 | 0.00 | 14 | 73.68 | 10 | 90.91 | 2 | 33.33 | 2 | 66.67 | 0 | 0.00 | 28 | 62.22 |
| 2 | Inadequate | 0 | 0.00 | 4 | 21.05 | 1 | 9.09 | 4 | 66.67 | 1 | 33.33 | 1 | 100.00 | 11 | 24.44 |

Distribution of land (ha): The data regarding the distribution of land (ha) in Bikkanahalli micro-watershed is presented in Table 16. The results indicate that, households of the Bikkanahalli micro-watershed possess 73.47 ha (89.81%) of dry land and 8.34 ha (10.19%) of irrigated land. Marginal farmers possess 12.10 ha (96.76%) of dry land and 0.40 ha (3.24%) of irrigated land. Small farmers possess 17.42 ha (100%) of dry land. Semi medium farmers possess 6.48 ha (65.04%) of dry land and 3.48 per cent (34.96%) of irrigated land. Medium farmers possess 9.15 ha (67.26%) of dry land and 4.45 ha (32.74%) of irrigated land; large farmers possess 28.33 ha (100%) of dry land.

Table 16. Distribution of land (Ha) in Bikkanahalli micro-watershed

| Sl. No. | Particulars | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|---------|-------------|---------|-------|---------|-----|---------|-------|---------|-------|--------|-----|----------|-------|
| | | ha | % | ha | % | ha | % | ha | % | ha | % | ha | % |
| 1 | Dry | 12.10 | 96.76 | 17.42 | 100 | 6.48 | 65.04 | 9.15 | 67.26 | 28.33 | 100 | 73.47 | 89.81 |
| 2 | Irrigated | 0.40 | 3.24 | 0 | 0 | 3.48 | 34.96 | 4.45 | 32.74 | 0 | 0 | 8.34 | 10.19 |
| Total | | 12.51 | 100 | 17.42 | 100 | 9.96 | 100 | 13.60 | 100 | 28.33 | 100 | 81.81 | 100 |

Average land value (Rs./ha): The data regarding the average land value (Rs./ha) in Bikkanahalli micro-watershed is presented in Table 17. The results indicate that, the average value of dry land was Rs. 151,492.43 and average value of irrigated land was Rs. 389,684.47. In case of marginal famers, the average land value was Rs. 417,034.44 for dry land and Rs. 1,235,000 for irrigated land. In case of small famers, the average land value was Rs. 225,823.66 for dry land. In case of semi medium famers, the average land value was Rs. 192,968.75 for dry land and Rs. 545,697.68 for irrigated land. In case of medium famers, the average land value was Rs. 65,575.22 for dry land and Rs. 190,863.64 for irrigated land and in case of large farmers it was Rs. 10,585.71 for dry land.

Table 17. Average land value (Rs./ha) in Bikkanahalli micro-watershed

| Sl.No. | Particulars | MF (19) | SF (11) | SMF (6) | MDF (3) | LF (1) | All (45) |
|--------|-------------|--------------|------------|------------|------------|-----------|------------|
| 1 | Dry | 417,034.44 | 225,823.66 | 192,968.75 | 65,575.22 | 10,585.71 | 151,492.43 |
| 2 | Irrigated | 1,235,000.00 | 0.00 | 545,697.68 | 190,863.64 | 0.00 | 389,684.47 |

Status of bore wells: The data regarding the status of bore wells in Bikkanahalli micro-watershed is presented in Table 18. The results indicate that, there were 8 functioning and 5 de-functioning bore wells in the micro watershed.

Table 18. Status of bore wells in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | MF (19) | SF (11) | SMF (6) | MDF (3) | LF (1) | All (45) |
|--------|----------------|--------|---------|---------|---------|---------|--------|----------|
| | | N | N | N | N | N | N | N |
| 1 | De-functioning | 0 | 1 | 0 | 3 | 1 | 0 | 5 |
| 2 | Functioning | 0 | 2 | 0 | 4 | 2 | 0 | 8 |

Source of irrigation: The data regarding the source of irrigation in Bikkanahalli micro-watershed is presented in Table 19. The results indicate that, bore well was the major irrigation source in the micro water shed for 17.78 per cent of the farmers.

Table 19. Source of irrigation in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|------|---------|-------|---------|------|---------|-------|---------|-------|--------|------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Bore Well | 0 | 0.00 | 2 | 10.53 | 0 | 0.00 | 4 | 66.67 | 2 | 66.67 | 0 | 0.00 | 8 | 17.78 |

Depth of water (Avg in meters): The data regarding the depth of water in Bikkanahalli micro-watershed is presented in Table 20. The results indicate that, the depth of bore well was found to be 14.09 meters.

Table 20. Depth of water (Avg in meters) in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | MF (19) | SF (11) | SMF (6) | MDF (3) | LF (1) | All (45) |
|--------|-------------|--------|---------|---------|---------|---------|--------|----------|
| 1 | Bore Well | 0.00 | 6.42 | 0.00 | 60.96 | 48.77 | 0.00 | 14.09 |

Irrigated Area (ha): The data regarding the irrigated area (ha) in Bikkanahalli micro-watershed is presented in Table 21. The results indicate that, marginal, semi medium and medium farmers had irrigated area of 1.21 ha, 3.08 ha and 4.45 ha respectively.

Table 21. Irrigated Area (ha) in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | MF (19) | SF (11) | SMF (6) | MDF (3) | LF (1) | All (45) |
|--------|-------------|--------|---------|---------|---------|---------|--------|----------|
| 1 | Kharif | 0.00 | 1.21 | 0.00 | 3.08 | 4.45 | 0.00 | 8.74 |
| | Total | 0.00 | 1.21 | 0.00 | 3.08 | 4.45 | 0.00 | 8.74 |

Table 22. Cropping pattern in Bikkanahalli micro-watershed (Area in ha)

| Sl.No. | Particulars | LL (5) | MF (19) | SF (11) | SMF (6) | MDF (3) | LF (1) | All (45) |
|--------|----------------------|--------|---------|---------|---------|---------|--------|----------|
| 1 | Kharif - Bajra | 0.00 | 3.36 | 1.31 | 0.00 | 0.00 | 1.62 | 6.30 |
| 2 | Kharif - Bengal gram | 0.00 | 0.61 | 0.81 | 0.00 | 0.00 | 0.00 | 1.42 |
| 3 | Kharif - Chilly | 0.00 | 0.00 | 0.00 | 0.65 | 0.00 | 0.00 | 0.65 |
| 4 | Kharif - Horsegram | 0.00 | 0.00 | 0.00 | 0.81 | 0.00 | 0.00 | 0.81 |
| 5 | Kharif - Jowar | 0.00 | 0.00 | 0.81 | 2.43 | 0.00 | 0.00 | 3.24 |
| 6 | Kharif - Maize | 0.00 | 5.34 | 6.91 | 3.64 | 6.07 | 0.00 | 21.98 |
| 7 | Kharif - Navane | 0.00 | 0.00 | 0.00 | 0.00 | 1.01 | 0.00 | 1.01 |
| 8 | Kharif - Onion | 0.00 | 0.00 | 0.40 | 0.00 | 0.00 | 0.00 | 0.40 |
| 9 | Kharif - Red gram | 0.00 | 0.40 | 0.00 | 0.00 | 1.42 | 0.00 | 1.82 |
| 10 | Kharif - Sorghum | 0.00 | 0.73 | 5.26 | 0.00 | 2.43 | 0.00 | 8.42 |
| 11 | Kharif - Sunflower | 0.00 | 1.87 | 0.00 | 2.43 | 2.43 | 0.00 | 6.73 |
| 12 | Rabi - Bajra | 0.00 | 0.00 | 0.00 | 0.00 | 0.81 | 0.00 | 0.81 |
| 13 | Rabi - Black gram | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.00 | 0.40 |
| 14 | Rabi - Greengram | 0.00 | 0.00 | 0.00 | 0.00 | 0.81 | 0.00 | 0.81 |
| | Total | 0.00 | 12.32 | 15.51 | 9.96 | 16.19 | 1.62 | 55.61 |

Cropping pattern: The data regarding the cropping pattern in Bikkanahalli micro-watershed is presented in Table 22. The results indicate that, farmers have grown maize (21.98 ha), bajra (6.30 ha), sunflower (6.73 ha), Bengal gram (1.42 ha), sorghum (8.42 ha), redgram (1.82 ha), navane (1.01), blackgram (0.40), Greengram (0.81), horsegram (0.81), onion (0.40) and chilly (0.65 ha). Marginal farmers have grown bajra, bengalgram, maize, redgram sorghum and sunflower. Small farmers have grown bajra, green gram, maize and red gram. Semi medium farmers have grown chilly and maize. Medium farmers have grown maize, navane, redgram, sorghum, sunflower, bajra, black gram and green gram. Large farmers have grown bajra only.

Cropping intensity: The data regarding the cropping intensity in Bikkanahalli micro-watershed is presented in Table 23. The results indicate that, the cropping intensity in Bikkanahalli micro-watershed was found to be 66.07 per cent. In case of marginal farmers it was 86.40 per cent, small farmers it was 76.21 per cent, in case of semi medium farmers it was 81.46, medium farmers it was 45.35 per cent and in case of large farmers it was 100 per cent.

Table 23. Cropping intensity (%) in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | MF (19) | SF (11) | SMF (6) | MDF (3) | LF (1) | All (45) |
|--------|--------------------|--------|---------|---------|---------|---------|--------|----------|
| 1 | Cropping Intensity | 0.00 | 86.40 | 76.21 | 81.46 | 45.35 | 100.00 | 66.07 |

Possession of Bank account and savings: The data regarding the cropping intensity in Bikkanahalli micro-watershed is presented in Table 24. The results indicate that, 75.56 per cent of the households have bank account and 24.44 per cent have savings.

Table 24. Possession of Bank account and savings in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|-------|---------|-------|---------|-------|---------|-------|---------|--------|--------|--------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Account | 1 | 20.00 | 15 | 78.95 | 9 | 81.82 | 5 | 83.33 | 3 | 100.00 | 1 | 100.00 | 34 | 75.56 |
| 2 | Savings | 0 | 0.00 | 4 | 21.05 | 1 | 9.09 | 4 | 66.67 | 2 | 66.67 | 0 | 0.00 | 11 | 24.44 |

Borrowing status: The data regarding the cropping intensity in Bikkanahalli micro-watershed is presented in Table 25. The results indicate that, 44.44 per cent of the households have availed credit from different sources.

Table 25. Borrowing status in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|----------------|--------|-------|---------|------|---------|-------|---------|-------|---------|--------|--------|--------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Credit Availed | 1 | 20.00 | 1 | 5.26 | 9 | 81.82 | 5 | 83.33 | 3 | 100.00 | 1 | 100.00 | 20 | 44.44 |

Cost of Cultivation of Maize: The data regarding the cost of cultivation of maize in Bikkannahalli micro-watershed is presented in Table 26. The results indicate that, the total cost of cultivation for maize was Rs. 46549.67. The gross income realized by the farmers was Rs. 33923.77. The net income from Maize cultivation was Rs. -12625.90, thus the benefit cost ratio was found to be 1:0.73.

Table 26. Cost of Cultivation of maize in Bikkannahalli micro-watershed

| Sl.No | Particulars | Units | Phy Units | Value (Rs.) | % to C3 |
|------------|--|--------------------------------|-----------|-------------|---------|
| I | Cost A1 | | | | |
| 1 | Hired Human Labour | Man days | 61.48 | 10753.74 | 23.10 |
| 2 | Bullock | Pairs/day | 1.16 | 720.56 | 1.55 |
| 3 | Tractor | Hours | 6.64 | 4896.91 | 10.52 |
| 4 | Machinery | Hours | 0.18 | 105.86 | 0.23 |
| 5 | Seed Main Crop (Establishment and Maintenance) | Kgs (Rs.) | 16.87 | 2715.73 | 5.83 |
| 6 | Seed Inter Crop | Kgs. | 0.00 | 0.00 | 0.00 |
| 7 | FYM | Quintal | 43.91 | 5530.79 | 11.88 |
| 8 | Fertilizer + micronutrients | Quintal | 6.05 | 4379.37 | 9.41 |
| 9 | Pesticides (PPC) | Kgs /liters | 2.23 | 2368.89 | 5.09 |
| 10 | Irrigation | Number | 14.82 | 0.00 | 0.00 |
| 12 | Msc. Charges (Marketing costs etc) | | 0.00 | 0.00 | 0.00 |
| 13 | Depreciation charges | | 0.00 | 428.67 | 0.92 |
| 14 | Land revenue and Taxes | | 0.00 | 4.35 | 0.01 |
| II | Cost B1 | | | | |
| 16 | Interest on working capital | | | 1799.49 | 3.87 |
| 17 | Cost B1 = (Cost A1 + sum of 15 and 16) | | | 33704.37 | 72.41 |
| III | Cost B2 | | | | |
| 18 | Rental Value of Land | | | 531.75 | 1.14 |
| 19 | Cost B2 = (Cost B1 + Rental value) | | | 34236.12 | 73.55 |
| IV | Cost C1 | | | | |
| 20 | Family Human Labour | | 37.38 | 8080.82 | 17.36 |
| 21 | Cost C1 = (Cost B2 + Family Labour) | | | 42316.93 | 90.91 |
| V | Cost C2 | | | | |
| 22 | Risk Premium | | | 0.95 | 0.00 |
| 23 | Cost C2 = (Cost C1 + Risk Premium) | | | 42317.89 | 90.91 |
| VI | Cost C3 | | | | |
| 24 | Managerial Cost | | | 4231.79 | 9.09 |
| 25 | Cost C3 = (Cost C2 + Managerial Cost) | | | 46549.67 | 100.00 |
| VII | Economics of the Crop | | | | |
| a. | Main Product | a) Main Product (q) | 28.37 | 32417.56 | |
| | | b) Main Crop Sales Price (Rs.) | | 1142.86 | |
| | By Product | e) Main Product (q) | 5.04 | 1506.21 | |
| | | f) Main Crop Sales Price (Rs.) | | 298.57 | |
| b. | Gross Income (Rs.) | | | 33923.77 | |
| c. | Net Income (Rs.) | | | -12625.90 | |
| d. | Cost per Quintal (Rs./q.) | | | 1641.07 | |
| e. | Benefit Cost Ratio (BC Ratio) | | | 1:0.73 | |

Cost of Cultivation of Redgram: The data regarding the cost of cultivation of redgram in Bikkanahalli micro-watershed is presented in Table 27. The results indicate that, the total cost of cultivation for redgram was Rs. 36636.55. The gross income realized by the farmers was Rs. 4763.57. The net income from redgram cultivation was Rs. -31872.97. Thus the benefit cost ratio was found to be 1:0.13.

Table 27. Cost of Cultivation of Redgram in Bikkanahalli micro-watershed

| Sl.No | Particulars | Units | Phy Units | Value (Rs.) | % to C3 |
|------------|--|--------------------------------|-----------|-------------|---------|
| I | Cost A1 | | | | |
| 1 | Hired Human Labour | Man days | 39.17 | 9633.00 | 26.29 |
| 2 | Bullock | Pairs/day | 0.00 | 0.00 | 0.00 |
| 3 | Tractor | Hours | 2.65 | 1984.82 | 5.42 |
| 4 | Machinery | Hours | 1.59 | 952.71 | 2.60 |
| 5 | Seed Main Crop (Establishment and Maintenance) | Kgs (Rs.) | 7.23 | 811.57 | 2.22 |
| 6 | Seed Inter Crop | Kgs. | 0.00 | 0.00 | 0.00 |
| 7 | FYM | Quintal | 15.88 | 3175.71 | 8.67 |
| 8 | Fertilizer + micronutrients | Quintal | 3.88 | 5434.00 | 14.83 |
| 9 | Pesticides (PPC) | Kgs / liters | 1.59 | 1455.54 | 3.97 |
| 10 | Irrigation | Number | 0.00 | 0.00 | 0.00 |
| 12 | Msc. Charges (Marketing costs etc) | | 0.00 | 0.00 | 0.00 |
| 13 | Depreciation charges | | 0.00 | 0.03 | 0.00 |
| 14 | Land revenue and Taxes | | 0.00 | 0.00 | 0.00 |
| II | Cost B1 | | | | |
| 16 | Interest on working capital | | | 1306.42 | 3.57 |
| 17 | Cost B1 = (Cost A1 + sum of 15 and 16) | | | 24753.81 | 67.57 |
| III | Cost B2 | | | | |
| 18 | Rental Value of Land | | | 250.00 | 0.68 |
| 19 | Cost B2 = (Cost B1 + Rental value) | | | 25003.81 | 68.25 |
| IV | Cost C1 | | | | |
| 20 | Family Human Labour | | 32.64 | 8292.14 | 22.63 |
| 21 | Cost C1 = (Cost B2 + Family Labour) | | | 33295.95 | 90.88 |
| V | Cost C2 | | | | |
| 22 | Risk Premium | | | 10.00 | 0.03 |
| 23 | Cost C2 = (Cost C1 + Risk Premium) | | | 33305.95 | 90.91 |
| VI | Cost C3 | | | | |
| 24 | Managerial Cost | | | 3330.60 | 9.09 |
| 25 | Cost C3 = (Cost C2 + Managerial Cost) | | | 36636.55 | 100.00 |
| VII | Economics of the Crop | | | | |
| a. | Main Product | a) Main Product (q) | 3.18 | 4763.57 | |
| | | b) Main Crop Sales Price (Rs.) | | 1500.00 | |
| b. | Gross Income (Rs.) | | | 4763.57 | |
| c. | Net Income (Rs.) | | | -31872.97 | |
| d. | Cost per Quintal (Rs./q.) | | | 11536.47 | |
| e. | Benefit Cost Ratio (BC Ratio) | | | 1:0.13 | |

Cost of Cultivation of Bajra:The data regarding the cost of cultivation of bajra in Bikkannahalli micro-watershed is presented in Table 28. The results indicate that, the total cost of cultivation for bajra was Rs. 31736.21. The gross income realized by the farmers was Rs. 18149.41. The net income from bajra cultivation was Rs. -13586.80. Thus the benefit cost ratio was found to be 1:0.57.

Table 28. Cost of Cultivation of Bajra in Bikkannahalli micro-watershed

| Sl.No | Particulars | Units | Phy Units | Value (Rs.) | % to C3 |
|------------|--|--------------------------------|-----------|-------------|---------|
| I | Cost A1 | | | | |
| 1 | Hired Human Labour | Man days | 44.10 | 8686.46 | 27.37 |
| 2 | Bullock | Pairs/day | 0.63 | 380.56 | 1.20 |
| 3 | Tractor | Hours | 2.64 | 1983.42 | 6.25 |
| 4 | Machinery | Hours | 0.58 | 345.80 | 1.09 |
| 5 | Seed Main Crop (Establishment and Maintenance) | Kgs (Rs.) | 10.12 | 1709.35 | 5.39 |
| 6 | Seed Inter Crop | Kgs. | 0.00 | 0.00 | 0.00 |
| 7 | FYM | Quintal | 19.21 | 3348.22 | 10.55 |
| 8 | Fertilizer + micronutrients | Quintal | 3.16 | 3657.62 | 11.53 |
| 9 | Pesticides (PPC) | Kgs / liters | 1.44 | 1312.19 | 4.13 |
| 10 | Irrigation | Number | 7.41 | 0.00 | 0.00 |
| 12 | Msc. Charges (Marketing costs etc) | | 0.00 | 0.00 | 0.00 |
| 13 | Depreciation charges | | 0.00 | 99.89 | 0.31 |
| 14 | Land revenue and Taxes | | 0.00 | 2.96 | 0.01 |
| II | Cost B1 | | | | |
| 16 | Interest on working capital | | | 1203.77 | 3.79 |
| 17 | Cost B1 = (Cost A1 + sum of 15 and 16) | | | 22730.24 | 71.62 |
| III | Cost B2 | | | | |
| 18 | Rental Value of Land | | | 323.33 | 1.02 |
| 19 | Cost B2 = (Cost B1 + Rental value) | | | 23053.58 | 72.64 |
| IV | Cost C1 | | | | |
| 20 | Family Human Labour | | 24.96 | 5793.53 | 18.26 |
| 21 | Cost C1 = (Cost B2 + Family Labour) | | | 28847.10 | 90.90 |
| V | Cost C2 | | | | |
| 22 | Risk Premium | | | 4.00 | 0.01 |
| 23 | Cost C2 = (Cost C1 + Risk Premium) | | | 28851.10 | 90.91 |
| VI | Cost C3 | | | | |
| 24 | Managerial Cost | | | 2885.11 | 9.09 |
| 25 | Cost C3 = (Cost C2 + Managerial Cost) | | | 31736.21 | 100.00 |
| VII | Economics of the Crop | | | | |
| a. | Main Product | a) Main Product (q) | 12.14 | 17964.16 | |
| | | b) Main Crop Sales Price (Rs.) | | 1480.00 | |
| | By Product | e) Main Product (q) | 1.24 | 185.25 | |
| | | f) Main Crop Sales Price (Rs.) | | 150.00 | |
| b. | Gross Income (Rs.) | | | 18149.41 | |
| c. | Net Income (Rs.) | | | -13586.80 | |
| d. | Cost per Quintal (Rs./q.) | | | 2614.63 | |
| e. | Benefit Cost Ratio (BC Ratio) | | | 1:0.57 | |

Cost of cultivation of Green gram: The data regarding the cost of cultivation of Green gram in Bikkanahalli micro-watershed is presented in Table 29. The results indicate that, the total cost of cultivation for Green gram was Rs. 20029.78. The gross income realized by the farmers was Rs. 7410. The net income from Green gram cultivation was Rs. -12619.78. Thus the benefit cost ratio was found to be 1:0.37.

Table 29. Cost of Cultivation of Green gram in Bikkanahalli micro-watershed

| Sl.No | Particulars | Units | Phy Units | Value (Rs.) | % to C3 |
|------------|--|--------------------------------|-----------|-------------|---------|
| I | Cost A1 | | | | |
| 1 | Hired Human Labour | Man days | 18.53 | 3643.25 | 18.19 |
| 2 | Bullock | Pairs/day | 0.00 | 0.00 | 0.00 |
| 3 | Tractor | Hours | 2.47 | 1852.50 | 9.25 |
| 4 | Machinery | Hours | 0.00 | 0.00 | 0.00 |
| 5 | Seed Main Crop (Establishment and Maintenance) | Kgs (Rs.) | 12.35 | 1235.00 | 6.17 |
| 6 | Seed Inter Crop | Kgs. | 0.00 | 0.00 | 0.00 |
| 7 | FYM | Quintal | 0.00 | 0.00 | 0.00 |
| 8 | Fertilizer + micronutrients | Quintal | 1.24 | 2470.00 | 12.33 |
| 9 | Pesticides (PPC) | Kgs / liters | 1.24 | 926.25 | 4.62 |
| 10 | Irrigation | Number | 0.00 | 0.00 | 0.00 |
| 11 | Repairs | | 0.00 | 0.00 | 0.00 |
| 12 | Msc. Charges (Marketing costs etc) | | 0.00 | 0.00 | 0.00 |
| 13 | Depreciation charges | | 0.00 | 0.02 | 0.00 |
| 14 | Land revenue and Taxes | | 0.00 | 0.00 | 0.00 |
| II | Cost B1 | | | | |
| 16 | Interest on working capital | | | 556.95 | 2.78 |
| 17 | Cost B1 = (Cost A1 + sum of 15 and 16) | | | 10683.97 | 53.34 |
| III | Cost B2 | | | | |
| 18 | Rental Value of Land | | | 166.67 | 0.83 |
| 19 | Cost B2 = (Cost B1 + Rental value) | | | 10850.64 | 54.17 |
| IV | Cost C1 | | | | |
| 20 | Family Human Labour | | 35.82 | 7348.25 | 36.69 |
| 21 | Cost C1 = (Cost B2 + Family Labour) | | | 18198.89 | 90.86 |
| V | Cost C2 | | | | |
| 22 | Risk Premium | | | 10.00 | 0.05 |
| 23 | Cost C2 = (Cost C1 + Risk Premium) | | | 18208.89 | 90.91 |
| VI | Cost C3 | | | | |
| 24 | Managerial Cost | | | 1820.89 | 9.09 |
| 25 | Cost C3 = (Cost C2 + Managerial Cost) | | | 20029.78 | 100.00 |
| VII | Economics of the Crop | | | | |
| a. | Main Product | a) Main Product (q) | | 2.47 | 7410.00 |
| | | b) Main Crop Sales Price (Rs.) | | | 3000.00 |
| b. | Gross Income (Rs.) | | | 7410.00 | |
| c. | Net Income (Rs.) | | | -12619.78 | |
| d. | Cost per Quintal (Rs./q.) | | | 8109.22 | |
| e. | Benefit Cost Ratio (BC Ratio) | | | 1:0.37 | |

Cost of Cultivation of Chilly: The data regarding the cost of cultivation of chilly in Bikkanahalli micro-watershed is presented in Table 30. The results indicate that, the total cost of cultivation for chilly was Rs. 30931.31. The gross income realized by the farmers was Rs. 27787.50. The net income from chilly cultivation was Rs. -3143.81. Thus the benefit cost ratio was found to be 1:0.9.

Table 30. Cost of Cultivation of Chilly in Bikkanahalli micro-watershed

| Sl.No | Particulars | Units | Phy Units | Value(Rs.) | % to C3 |
|------------|--|--------------------------------|-----------|------------|----------|
| I | Cost A1 | | | | |
| 1 | Hired Human Labour | Man days | 46.31 | 5804.50 | 18.77 |
| 2 | Bullock | Pairs/day | 1.54 | 1003.44 | 3.24 |
| 3 | Tractor | Hours | 3.09 | 2315.62 | 7.49 |
| 4 | Machinery | Hours | 0.00 | 0.00 | 0.00 |
| 5 | Seed Main Crop (Establishment and Maintenance) | Kgs (Rs.) | 0.93 | 1852.50 | 5.99 |
| 6 | Seed Inter Crop | Kgs. | 0.00 | 0.00 | 0.00 |
| 7 | FYM | Quintal | 30.87 | 3705.00 | 11.98 |
| 8 | Fertilizer + micronutrients | Quintal | 3.09 | 3010.31 | 9.73 |
| 9 | Pesticides (PPC) | Kgs / liters | 1.54 | 1852.50 | 5.99 |
| 10 | Irrigation | Number | 15.44 | 0.00 | 0.00 |
| 11 | Repairs | | 0.00 | 0.00 | 0.00 |
| 12 | Msc. Charges (Marketing costs etc) | | 0.00 | 0.00 | 0.00 |
| 13 | Depreciation charges | | 0.00 | 0.03 | 0.00 |
| 14 | Land revenue and Taxes | | 0.00 | 4.12 | 0.01 |
| II | Cost B1 | | | | |
| 16 | Interest on working capital | | | 1250.44 | 4.04 |
| 17 | Cost B1 = (Cost A1 + sum of 15 and 16) | | | 20798.46 | 67.24 |
| III | Cost B2 | | | | |
| 18 | Rental Value of Land | | | 466.67 | 1.51 |
| 19 | Cost B2 = (Cost B1 + Rental value) | | | 21265.13 | 68.75 |
| IV | Cost C1 | | | | |
| 20 | Family Human Labour | | 41.68 | 6854.25 | 22.16 |
| 21 | Cost C1 = (Cost B2 + Family Labour) | | | 28119.38 | 90.91 |
| V | Cost C2 | | | | |
| 22 | Risk Premium | | | 0.00 | 0.00 |
| 23 | Cost C2 = (Cost C1 + Risk Premium) | | | 28119.38 | 90.91 |
| VI | Cost C3 | | | | |
| 24 | Managerial Cost | | | 2811.94 | 9.09 |
| 25 | Cost C3 = (Cost C2 + Managerial Cost) | | | 30931.31 | 100.00 |
| VII | Economics of the Crop | | | | |
| a. | Main Product | a) Main Product (q) | | 15.44 | 27787.50 |
| | | b) Main Crop Sales Price (Rs.) | | | 1800.00 |
| b. | Gross Income (Rs.) | | | 27787.50 | |
| c. | Net Income (Rs.) | | | -3143.81 | |
| d. | Cost per Quintal (Rs./q.) | | | 2003.65 | |
| e. | Benefit Cost Ratio (BC Ratio) | | | 1:0.9 | |

Cost of Cultivation of Sunflower: The data regarding the cost of cultivation of sunflower in Bikkanahalli micro-watershed is presented in Table 31. The results indicate that, the total cost of cultivation for sunflower was Rs. 37640.24. The gross income realized by the farmers was Rs. 22297.69. The net income from sunflower cultivation was Rs. -15342.56. Thus the benefit cost ratio was found to be 1:0.59.

Table 31. Cost of Cultivation of Sunflower in Bikkanahalli micro-watershed

| Sl.No | Particulars | Units | Phy Units | Value (Rs.) | % to C3 |
|------------|--|--------------------------------|-----------|-------------|---------|
| I | Cost A1 | | | | |
| 1 | Hired Human Labour | Man days | 46.82 | 9685.97 | 25.73 |
| 2 | Bullock | Pairs/day | 0.24 | 146.27 | 0.39 |
| 3 | Tractor | Hours | 2.97 | 2101.61 | 5.58 |
| 4 | Machinery | Hours | 0.75 | 452.83 | 1.20 |
| 5 | Seed Main Crop (Establishment and Maintenance) | Kgs (Rs.) | 5.71 | 2159.19 | 5.74 |
| 6 | Seed Inter Crop | Kgs. | 0.00 | 0.00 | 0.00 |
| 7 | FYM | Quintal | 17.62 | 2839.06 | 7.54 |
| 8 | Fertilizer + micronutrients | Quintal | 3.22 | 4602.89 | 12.23 |
| 9 | Pesticides (PPC) | Kgs / liters | 1.25 | 1523.24 | 4.05 |
| 10 | Irrigation | Number | 9.26 | 0.00 | 0.00 |
| 12 | Msc. Charges (Marketing costs etc) | | 0.00 | 0.00 | 0.00 |
| 13 | Depreciation charges | | 0.00 | 416.53 | 1.11 |
| 14 | Land revenue and Taxes | | 0.00 | 2.33 | 0.01 |
| II | Cost B1 | | | | |
| 16 | Interest on working capital | | | 1335.53 | 3.55 |
| 17 | Cost B1 = (Cost A1 + sum of 15 and 16) | | | 25265.45 | 67.12 |
| III | Cost B2 | | | | |
| 18 | Rental Value of Land | | | 366.67 | 0.97 |
| 19 | Cost B2 = (Cost B1 + Rental value) | | | 25632.12 | 68.10 |
| IV | Cost C1 | | | | |
| 20 | Family Human Labour | | 31.94 | 8581.29 | 22.80 |
| 21 | Cost C1 = (Cost B2 + Family Labour) | | | 34213.40 | 90.90 |
| V | Cost C2 | | | | |
| 22 | Risk Premium | | | 5.00 | 0.01 |
| 23 | Cost C2 = (Cost C1 + Risk Premium) | | | 34218.40 | 90.91 |
| VI | Cost C3 | | | | |
| 24 | Managerial Cost | | | 3421.84 | 9.09 |
| 25 | Cost C3 = (Cost C2 + Managerial Cost) | | | 37640.24 | 100.00 |
| VII | Economics of the Crop | | | | |
| a. | Main Product | a) Main Product (q) | 8.89 | 22297.69 | |
| | | b) Main Crop Sales Price (Rs.) | | 2508.33 | |
| b. | Gross Income (Rs.) | | | 22297.69 | |
| c. | Net Income (Rs.) | | | -15342.56 | |
| d. | Cost per Quintal (Rs./q.) | | | 4234.26 | |
| e. | Benefit Cost Ratio (BC Ratio) | | | 1:0.59 | |

Cost of Cultivation of Bengal gram: The data regarding the cost of cultivation of bengal gram in Bikkanahalli micro-watershed is presented in Table 32. The results indicate that, the total cost of cultivation for bengal gram was Rs. 49117.08. The gross income realized by the farmers was Rs. 25214.58. The net income from bengal gram cultivation was Rs. - 23902.50. Thus the benefit cost ratio was found to be 1:0.51.

Table 32. Cost of Cultivation of Bengal gram in Bikkanahalli micro-watershed

| Sl.No | Particulars | Units | Phy Units | Value(Rs.) | % to C3 |
|------------|--|--------------------------------|-----------|------------|---------|
| I | Cost A1 | | | | |
| 1 | Hired Human Labour | Man days | 34.58 | 8974.33 | 18.27 |
| 2 | Bullock | Pairs/day | 0.00 | 0.00 | 0.00 |
| 3 | Tractor | Hours | 2.06 | 1543.75 | 3.14 |
| 4 | Machinery | Hours | 1.44 | 864.50 | 1.76 |
| 5 | Seed Main Crop (Establishment and Maintenance) | Kgs (Rs.) | 82.33 | 8562.67 | 17.43 |
| 6 | Seed Inter Crop | Kgs. | 0.00 | 0.00 | 0.00 |
| 7 | FYM | Quintal | 14.41 | 2881.67 | 5.87 |
| 8 | Fertilizer + micronutrients | Quintal | 4.12 | 6751.33 | 13.75 |
| 9 | Pesticides (PPC) | Kgs / liters | 1.44 | 2161.25 | 4.40 |
| 10 | Irrigation | Number | 0.00 | 0.00 | 0.00 |
| 12 | Msc. Charges (Marketing costs etc) | | 0.00 | 0.00 | 0.00 |
| 13 | Depreciation charges | | 0.00 | 0.03 | 0.00 |
| 14 | Land revenue and Taxes | | 0.00 | 0.00 | 0.00 |
| II | Cost B1 | | | | |
| 16 | Interest on working capital | | | 2444.03 | 4.98 |
| 17 | Cost B1 = (Cost A1 + sum of 15 and 16) | | | 34183.56 | 69.60 |
| III | Cost B2 | | | | |
| 18 | Rental Value of Land | | | 166.67 | 0.34 |
| 19 | Cost B2 = (Cost B1 + Rental value) | | | 34350.23 | 69.94 |
| IV | Cost C1 | | | | |
| 20 | Family Human Labour | | 39.52 | 10291.67 | 20.95 |
| 21 | Cost C1 = (Cost B2 + Family Labour) | | | 44641.89 | 90.89 |
| V | Cost C2 | | | | |
| 22 | Risk Premium | | | 10.00 | 0.02 |
| 23 | Cost C2 = (Cost C1 + Risk Premium) | | | 44651.89 | 90.91 |
| VI | Cost C3 | | | | |
| 24 | Managerial Cost | | | 4465.19 | 9.09 |
| 25 | Cost C3 = (Cost C2 + Managerial Cost) | | | 49117.08 | 100.00 |
| VII | Economics of the Crop | | | | |
| a. | Main Product | a) Main Product (q) | 7.20 | 25214.58 | |
| | | b) Main Crop Sales Price (Rs.) | | 3500.00 | |
| b. | Gross Income (Rs.) | | | 25214.58 | |
| c. | Net Income (Rs.) | | | -23902.50 | |
| d. | Cost per Quintal (Rs./q.) | | | 6817.87 | |
| e. | Benefit Cost Ratio (BC Ratio) | | | 1:0.51 | |

Cost of Cultivation of Sorghum: The data regarding the cost of cultivation of sorghum in Bikkanahalli micro-watershed is presented in Table 33. The results indicate that, the total cost of cultivation for sorghum was Rs. 25990.03. The gross income realized by the farmers was Rs. 17599.03. The net income from sorghum cultivation was Rs. -8391.01. Thus the benefit cost ratio was found to be 1:0.68.

Table 33. Cost of Cultivation of Sorghum in Bikkanahalli micro-watershed

| Sl.No | Particulars | Units | Phy Units | Value(Rs.) | % to C3 |
|------------|--|--------------------------------|-----------|------------|----------|
| I | Cost A1 | | | | |
| 1 | Hired Human Labour | Man days | 45.53 | 7481.37 | 28.79 |
| 2 | Bullock | Pairs/day | 1.42 | 894.24 | 3.44 |
| 3 | Tractor | Hours | 2.97 | 2129.94 | 8.20 |
| 4 | Machinery | Hours | 0.00 | 0.00 | 0.00 |
| 5 | Seed Main Crop (Establishment and Maintenance) | Kgs (Rs.) | 7.16 | 1052.26 | 4.05 |
| 6 | Seed Inter Crop | Kgs. | 0.00 | 0.00 | 0.00 |
| 7 | FYM | Quintal | 49.40 | 5928.00 | 22.81 |
| 8 | Fertilizer + micronutrients | Quintal | 2.16 | 1570.92 | 6.04 |
| 9 | Pesticides (PPC) | Kgs / liters | 0.00 | 0.00 | 0.00 |
| 10 | Irrigation | Number | 0.00 | 0.00 | 0.00 |
| 13 | Depreciation charges | | 0.00 | 206.82 | 0.80 |
| 14 | Land revenue and Taxes | | 0.00 | 5.41 | 0.02 |
| II | Cost B1 | | | | |
| 16 | Interest on working capital | | | 1026.14 | 3.95 |
| 17 | Cost B1 = (Cost A1 + sum of 15 and 16) | | | 20295.10 | 78.09 |
| III | Cost B2 | | | | |
| 18 | Rental Value of Land | | | 400.00 | 1.54 |
| 19 | Cost B2 = (Cost B1 + Rental value) | | | 20695.10 | 79.63 |
| IV | Cost C1 | | | | |
| 20 | Family Human Labour | | 13.84 | 2932.20 | 11.28 |
| 21 | Cost C1 = (Cost B2 + Family Labour) | | | 23627.30 | 90.91 |
| V | Cost C2 | | | | |
| 22 | Risk Premium | | | 0.00 | 0.00 |
| 23 | Cost C2 = (Cost C1 + Risk Premium) | | | 23627.30 | 90.91 |
| VI | Cost C3 | | | | |
| 24 | Managerial Cost | | | 2362.73 | 9.09 |
| 25 | Cost C3 = (Cost C2 + Managerial Cost) | | | 25990.03 | 100.00 |
| VII | Economics of the Crop | | | | |
| a. | Main Product | a) Main Product (q) | | 12.54 | 17373.50 |
| | | b) Main Crop Sales Price (Rs.) | | | 1385.71 |
| | By Product | e) Main Product (q) | | 1.66 | 225.53 |
| | | f) Main Crop Sales Price (Rs.) | | | 135.71 |
| b. | Gross Income (Rs.) | | | 17599.03 | |
| c. | Net Income (Rs.) | | | -8391.01 | |
| d. | Cost per Quintal (Rs./q.) | | | 2072.97 | |
| e. | Benefit Cost Ratio (BC Ratio) | | | 1:0.68 | |

Cost of Cultivation of Navane: The data regarding the cost of cultivation of navane in Bikkannahalli micro-watershed is presented in Table 34. The results indicate that, the total cost of cultivation for navane was Rs. 22542.34. The gross income realized by the farmers was Rs. 8892. The net income from navane cultivation was Rs. -13650.34. Thus the benefit cost ratio was found to be 1:0.39.

Table 34. Cost of Cultivation of Navane in Bikkannahalli micro-watershed

| Sl.No | Particulars | Units | Phy Units | Value(Rs.) | % to C3 |
|------------|--|--------------------------------|-----------|------------|---------|
| I | Cost A1 | | | | |
| 1 | Hired Human Labour | Man days | 15.81 | 3161.60 | 14.03 |
| 2 | Bullock | Pairs/day | 0.00 | 0.00 | 0.00 |
| 3 | Tractor | Hours | 1.98 | 1482.00 | 6.57 |
| 4 | Machinery | Hours | 0.00 | 0.00 | 0.00 |
| 5 | Seed Main Crop (Establishment and Maintenance) | Kgs (Rs.) | 1.98 | 256.88 | 1.14 |
| 6 | Seed Inter Crop | Kgs. | 0.00 | 0.00 | 0.00 |
| 7 | FYM | Quintal | 0.00 | 0.00 | 0.00 |
| 8 | Fertilizer + micronutrients | Quintal | 3.95 | 5532.80 | 24.54 |
| 9 | Pesticides (PPC) | Kgs / liters | 1.98 | 1482.00 | 6.57 |
| 10 | Irrigation | Number | 4.94 | 0.00 | 0.00 |
| 11 | Repairs | | 0.00 | 0.00 | 0.00 |
| 12 | Msc. Charges (Marketing costs etc) | | 0.00 | 0.00 | 0.00 |
| 13 | Depreciation charges | | 0.00 | 0.02 | 0.00 |
| 14 | Land revenue and Taxes | | 0.00 | 0.00 | 0.00 |
| II | Cost B1 | | | | |
| 16 | Interest on working capital | | | 873.80 | 3.88 |
| 17 | Cost B1 = (Cost A1 + sum of 15 and 16) | | | 12789.10 | 56.73 |
| III | Cost B2 | | | | |
| 18 | Rental Value of Land | | | 333.33 | 1.48 |
| 19 | Cost B2 = (Cost B1 + Rental value) | | | 13122.43 | 58.21 |
| IV | Cost C1 | | | | |
| 20 | Family Human Labour | | 34.58 | 7360.60 | 32.65 |
| 21 | Cost C1 = (Cost B2 + Family Labour) | | | 20483.03 | 90.86 |
| V | Cost C2 | | | | |
| 22 | Risk Premium | | | 10.00 | 0.04 |
| 23 | Cost C2 = (Cost C1 + Risk Premium) | | | 20493.03 | 90.91 |
| VI | Cost C3 | | | | |
| 24 | Managerial Cost | | | 2049.30 | 9.09 |
| 25 | Cost C3 = (Cost C2 + Managerial Cost) | | | 22542.34 | 100.00 |
| VII | Economics of the Crop | | | | |
| a. | Main Product | a) Main Product (q) | | 2.96 | 8892.00 |
| | | b) Main Crop Sales Price (Rs.) | | | 3000.00 |
| b. | Gross Income (Rs.) | | | 8892.00 | |
| c. | Net Income (Rs.) | | | -13650.34 | |
| d. | Cost per Quintal (Rs./q.) | | | 7605.38 | |
| e. | Benefit Cost Ratio (BC Ratio) | | | 1:0.39 | |

Cost of Cultivation of Blackgram: The data regarding the cost of cultivation of blackgram in Bikkanahalli micro-watershed is presented in Table 35. The results indicate that, the total cost of cultivation for black gram was Rs. 29957.73. The gross income realized by the farmers was Rs. 25935. The net income from black gram cultivation was Rs. -4022.73. Thus the benefit cost ratio was found to be 1:0.87.

Table 35. Cost of Cultivation of Blackgram in Bikkanahalli micro-watershed

| Sl.No | Particulars | Units | Phy Units | Value(Rs.) | % to C3 |
|------------|--|--------------------------------|-----------|------------|----------|
| I | Cost A1 | | | | |
| 1 | Hired Human Labour | Man days | 39.52 | 5681.00 | 18.96 |
| 2 | Bullock | Pairs/day | 0.00 | 0.00 | 0.00 |
| 3 | Tractor | Hours | 2.47 | 1852.50 | 6.18 |
| 4 | Machinery | Hours | 0.00 | 0.00 | 0.00 |
| 5 | Seed Main Crop (Establishment and Maintenance) | Kgs (Rs.) | 12.35 | 1111.50 | 3.71 |
| 6 | Seed Inter Crop | Kgs. | 0.00 | 0.00 | 0.00 |
| 7 | FYM | Quintal | 0.00 | 0.00 | 0.00 |
| 8 | Fertilizer + micronutrients | Quintal | 2.47 | 4940.00 | 16.49 |
| 9 | Pesticides (PPC) | Kgs / liters | 2.47 | 1235.00 | 4.12 |
| 10 | Irrigation | Number | 0.00 | 0.00 | 0.00 |
| 12 | Msc. Charges (Marketing costs etc) | | 0.00 | 0.00 | 0.00 |
| 13 | Depreciation charges | | 0.00 | 0.05 | 0.00 |
| 14 | Land revenue and Taxes | | 0.00 | 0.00 | 0.00 |
| II | Cost B1 | | | | |
| 16 | Interest on working capital | | | 875.58 | 2.92 |
| 17 | Cost B1 = (Cost A1 + sum of 15 and 16) | | | 15695.63 | 52.39 |
| III | Cost B2 | | | | |
| 18 | Rental Value of Land | | | 166.67 | 0.56 |
| 19 | Cost B2 = (Cost B1 + Rental value) | | | 15862.30 | 52.95 |
| IV | Cost C1 | | | | |
| 20 | Family Human Labour | | 74.10 | 11362.00 | 37.93 |
| 21 | Cost C1 = (Cost B2 + Family Labour) | | | 27224.30 | 90.88 |
| V | Cost C2 | | | | |
| 22 | Risk Premium | | | 10.00 | 0.03 |
| 23 | Cost C2 = (Cost C1 + Risk Premium) | | | 27234.30 | 90.91 |
| VI | Cost C3 | | | | |
| 24 | Managerial Cost | | | 2723.43 | 9.09 |
| 25 | Cost C3 = (Cost C2 + Managerial Cost) | | | 29957.73 | 100.00 |
| VII | Economics of the Crop | | | | |
| a. | Main Product | a) Main Product (q) | | 7.41 | 25935.00 |
| | | b) Main Crop Sales Price (Rs.) | | | 3500.00 |
| b. | Gross Income (Rs.) | | | | 25935.00 |
| c. | Net Income (Rs.) | | | | -4022.73 |
| d. | Cost per Quintal (Rs./q.) | | | | 4042.88 |
| e. | Benefit Cost Ratio (BC Ratio) | | | | 1:0.87 |

Cost of Cultivation of Horsegram: The data regarding the cost of cultivation of horsegram in Bikkanahalli micro-watershed is presented in Table 36. The results indicate that, the total cost of cultivation for horsegram was Rs. 34435.29. The gross income realized by the farmers was Rs. 6669. The net income from horsegram cultivation was Rs. -27766.29. Thus the benefit cost ratio was found to be 1:0.19.

Table 36. Cost of Cultivation of Horsegram in Bikkanahalli micro-watershed

| Sl.No | Particulars | Units | Phy Units | Value(Rs.) | % to C3 |
|------------|--|--------------------------------|-----------|------------|---------|
| I | Cost A1 | | | | |
| 1 | Hired Human Labour | Man days | 22.23 | 5434.00 | 15.78 |
| 2 | Bullock | Pairs/day | 0.00 | 0.00 | 0.00 |
| 3 | Tractor | Hours | 2.47 | 1852.50 | 5.38 |
| 4 | Machinery | Hours | 1.24 | 741.00 | 2.15 |
| 5 | Seed Main Crop (Establishment and Maintenance) | Kgs (Rs.) | 6.18 | 555.75 | 1.61 |
| 6 | Seed Inter Crop | Kgs. | 0.00 | 0.00 | 0.00 |
| 7 | FYM | Quintal | 12.35 | 2470.00 | 7.17 |
| 8 | Fertilizer + micronutrients | Quintal | 2.47 | 4940.00 | 14.35 |
| 9 | Pesticides (PPC) | Kgs / liters | 1.24 | 1852.50 | 5.38 |
| 10 | Irrigation | Number | 0.00 | 0.00 | 0.00 |
| 12 | Msc. Charges (Marketing costs etc) | | 0.00 | 0.00 | 0.00 |
| 13 | Depreciation charges | | 0.00 | 370.50 | 1.08 |
| 14 | Land revenue and Taxes | | 0.00 | 0.00 | 0.00 |
| II | Cost B1 | | | | |
| 16 | Interest on working capital | | | 1179.39 | 3.42 |
| 17 | Cost B1 = (Cost A1 + sum of 15 and 16) | | | 19395.64 | 56.32 |
| III | Cost B2 | | | | |
| 18 | Rental Value of Land | | | 166.67 | 0.48 |
| 19 | Cost B2 = (Cost B1 + Rental value) | | | 19562.31 | 56.81 |
| IV | Cost C1 | | | | |
| 20 | Family Human Labour | | 43.23 | 11732.50 | 34.07 |
| 21 | Cost C1 = (Cost B2 + Family Labour) | | | 31294.81 | 90.88 |
| V | Cost C2 | | | | |
| 22 | Risk Premium | | | 10.00 | 0.03 |
| 23 | Cost C2 = (Cost C1 + Risk Premium) | | | 31304.81 | 90.91 |
| VI | Cost C3 | | | | |
| 24 | Managerial Cost | | | 3130.48 | 9.09 |
| 25 | Cost C3 = (Cost C2 + Managerial Cost) | | | 34435.29 | 100.00 |
| VII | Economics of the Crop | | | | |
| a. | Main Product | a) Main Product (q) | | 3.71 | 6669.00 |
| | | b) Main Crop Sales Price (Rs.) | | | 1800.00 |
| b. | Gross Income (Rs.) | | | 6669.00 | |
| c. | Net Income (Rs.) | | | -27766.29 | |
| d. | Cost per Quintal (Rs./q.) | | | 9294.27 | |
| e. | Benefit Cost Ratio (BC Ratio) | | | 1:0.19 | |

Cost of Cultivation of Onion: The data regarding the cost of cultivation of onion in Bikkanahalli micro-watershed is presented in Table 37. The results indicate that, the total cost of cultivation for onion was Rs. 89144.62. The gross income realized by the farmers was Rs. 29640. The net income from onion cultivation was Rs. -59504.62. Thus the benefit cost ratio was found to be 1:0.33.

Table 37. Cost of Cultivation of Onion in Bikkanahalli micro-watershed

| Sl.No | Particulars | Units | Phy Units | Value(Rs.) | % to C3 |
|------------|--|--------------------------------|-----------|------------|-----------|
| I | Cost A1 | | | | |
| 1 | Hired Human Labour | Man days | 76.57 | 12695.80 | 14.24 |
| 2 | Bullock | Pairs/day | 4.94 | 2470.00 | 2.77 |
| 3 | Tractor | Hours | 0.00 | 0.00 | 0.00 |
| 4 | Machinery | Hours | 0.00 | 0.00 | 0.00 |
| 5 | Seed Main Crop (Establishment and Maintenance) | Kgs (Rs.) | 12.35 | 37050.00 | 41.56 |
| 6 | Seed Inter Crop | Kgs. | 0.00 | 0.00 | 0.00 |
| 7 | FYM | Quintal | 49.40 | 5928.00 | 6.65 |
| 8 | Fertilizer + micronutrients | Quintal | 4.94 | 5928.00 | 6.65 |
| 9 | Pesticides (PPC) | Kgs / liters | 2.47 | 2470.00 | 2.77 |
| 10 | Irrigation | Number | 0.00 | 0.00 | 0.00 |
| 11 | Repairs | | 0.00 | 0.00 | 0.00 |
| 12 | Msc. Charges (Marketing costs etc) | | 0.00 | 0.00 | 0.00 |
| 13 | Depreciation charges | | 0.00 | 1235.00 | 1.39 |
| 14 | Land revenue and Taxes | | 0.00 | 4.94 | 0.01 |
| II | Cost B1 | | | | |
| 16 | Interest on working capital | | | 6165.12 | 6.92 |
| 17 | Cost B1 = (Cost A1 + sum of 15 and 16) | | | 73946.86 | 82.95 |
| III | Cost B2 | | | | |
| 18 | Rental Value of Land | | | 400.00 | 0.45 |
| 19 | Cost B2 = (Cost B1 + Rental value) | | | 74346.86 | 83.40 |
| IV | Cost C1 | | | | |
| 20 | Family Human Labour | | 32.11 | 6693.70 | 7.51 |
| 21 | Cost C1 = (Cost B2 + Family Labour) | | | 81040.56 | 90.91 |
| V | Cost C2 | | | | |
| 22 | Risk Premium | | | 0.00 | 0.00 |
| 23 | Cost C2 = (Cost C1 + Risk Premium) | | | 81040.56 | 90.91 |
| VI | Cost C3 | | | | |
| 24 | Managerial Cost | | | 8104.06 | 9.09 |
| 25 | Cost C3 = (Cost C2 + Managerial Cost) | | | 89144.62 | 100.00 |
| VII | Economics of the Crop | | | | |
| a. | Main Product | a) Main Product (q) | | 24.70 | 29640.00 |
| | | b) Main Crop Sales Price (Rs.) | | | 1200.00 |
| b. | Gross Income (Rs.) | | | | 29640.00 |
| c. | Net Income (Rs.) | | | | -59504.62 |
| d. | Cost per Quintal (Rs./q.) | | | | 3609.09 |
| e. | Benefit Cost Ratio (BC Ratio) | | | | 1:0.33 |

Adequacy of fodder: The data regarding the adequacy of fodder in Bikkanahalli micro-watershed is presented in Table 38. The results indicate that, 28.89 per cent of the households opined that dry fodder was adequate and 2.22 per cent opined that dry fodder was inadequate.

Table 38. Adequacy of fodder in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-----------------------|--------|------|---------|-------|---------|-------|---------|-------|---------|-------|--------|------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Adequate-Dry Fodder | 0 | 0.00 | 7 | 36.84 | 2 | 18.18 | 2 | 33.33 | 2 | 66.67 | 0 | 0.00 | 13 | 28.89 |
| 2 | Inadequate-Dry Fodder | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 16.67 | 0 | 0.00 | 0 | 0.00 | 1 | 2.22 |

Average annual gross income: The data regarding the average annual gross income in Bikkanahalli micro-watershed is presented in Table 39. The results indicate that the average annual gross income was Rs. 27,000 for landless farmers, for marginal farmers it was Rs. 43,955.79, for small farmers it was Rs. 40,545.45, for semi medium farmers it was Rs. 135,300, for medium farmers it was Rs. 170,333.33 and for large farmers it was Rs. 25,000.

Table 39. Average annual gross income in Bikkanahalli micro-watershed

(Avg value in Rs.)

| Sl.No. | Particulars | LL (5) | MF (19) | SF (11) | SMF (6) | MDF (3) | LF (1) | All (45) |
|--------|----------------|--------|-----------|-----------|------------|------------|--------|-----------|
| 1 | Service/salary | 11,600 | 0 | 0 | 0 | 72,000 | 0 | 6,088.89 |
| 2 | Business | 0 | 0 | 0 | 16,666.67 | 0 | 0 | 2,222.22 |
| 3 | Wage | 15,400 | 10,105.26 | 1,090.91 | 8,333.33 | 0 | 0 | 7,355.56 |
| 4 | Agriculture | 0 | 31,957.89 | 39,454.55 | 106,966.67 | 98,333.33 | 25,000 | 44,511.11 |
| 5 | Dairy Farm | 0 | 1,892.63 | 0 | 3,333.33 | 0 | 0 | 1,243.56 |
| | Income(Rs.) | 27,000 | 43,955.79 | 40,545.45 | 135,300 | 170,333.33 | 25,000 | 61,421.33 |

Average annual expenditure: The data regarding the average annual expenditure in Bikkanahalli micro-watershed is presented in Table 40. The results indicate that the average annual expenditure is Rs. 5,601.85. For landless households it was Rs. 1,500, for marginal farmers it was Rs. 1,820.18, for small farmers it was Rs. 2,727.27, for semi medium farmers it was Rs. 9,111.11, for medium farmers it was Rs. 30,111.11 and for large farmers it was Rs. 35,000.

Table 40. Average annual expenditure in Bikkanahalli micro-watershed

(Avg value in Rs.)

| Sl.No. | Particulars | LL (5) | MF (19) | SF (11) | SMF (6) | MDF (3) | LF (1) | All (45) |
|--------|----------------|----------|-----------|-----------|-----------|-----------|-----------|------------|
| 1 | Service/salary | 0.00 | 0.00 | 0.00 | 0.00 | 30,000.00 | 0.00 | 666.67 |
| 2 | Business | 0.00 | 0.00 | 0.00 | 15,000.00 | 0.00 | 0.00 | 666.67 |
| 3 | Wage | 7,500.00 | 10,333.33 | 2,000.00 | 10,000.00 | 0.00 | 0.00 | 2,200.00 |
| 4 | Agriculture | 0.00 | 20,000.00 | 28,000.00 | 21,666.67 | 60,333.33 | 35,000.00 | 22,533.33 |
| 7 | Dairy Farm | 0.00 | 4,250.00 | 0.00 | 8,000.00 | 0.00 | 0.00 | 555.56 |
| | Total | 7,500.00 | 34,583.33 | 30,000.00 | 54,666.67 | 90,333.33 | 35,000.00 | 252,083.33 |
| | Average | 1,500.00 | 1,820.18 | 2,727.27 | 9,111.11 | 30,111.11 | 35,000.00 | 5,601.85 |

Horticulture species grown: The data regarding horticulture species grown in Bikkanahalli micro-watershed is presented in Table 41. The results indicate that, sampled

households have grown 23 coconut, 1 custard apple, 1 lime and 2 mango tree in their fields.

Table 41. Horticulture species grown in Bikkanahalli micro-watershed

| Sl. No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|---------|---------------|--------|---|---------|---|---------|---|---------|---|---------|---|--------|---|----------|---|
| | | F | B | F | B | F | B | F | B | F | B | F | B | F | B |
| 1 | Coconut | 0 | 0 | 1 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 23 | 0 |
| 2 | Custard apple | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 3 | Mango | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 4 | Lime | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

*F= Field B=Back Yard

Forest species grown: The data regarding forest species grown in Bikkanahalli micro-watershed is presented in Table 42. The results indicate that, households have planted 37 neem trees, 6 tamarind trees, 1 acacia, 18 teak and 5 banyan trees in their fields.

Table 42. Forest species grown in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|---|---------|---|---------|---|---------|---|---------|---|--------|---|----------|---|
| | | F | B | F | B | F | B | F | B | F | B | F | B | F | B |
| 1 | Neem | 0 | 0 | 16 | 0 | 11 | 0 | 9 | 0 | 1 | 0 | 0 | 0 | 37 | 0 |
| 2 | Tamarind | 0 | 0 | 2 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 6 | 0 |
| 3 | Acacia | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 4 | Banyan | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 5 | 0 |
| 5 | Teak | 0 | 0 | 0 | 0 | 1 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 18 | 0 |

*F= Field B=Back Yard

Average Additional investment capacity: The data regarding average additional investment capacity in Bikkanahalli micro watershed is presented in Table 43. The results indicate that, the average additional investment capacity with the households for land development was Rs. 2933.33, for improved crop production Rs.1822.22 and for improved livestock management Rs. 1066.67.

Table 43. Average Additional investment capacity in Bikkanahalli micro watershed

| Sl.No. | Particulars | MF (19) | SF (11) | SMF (6) | MDF (3) | All (45) |
|--------|-------------------------------|----------|----------|----------|----------|----------|
| 1 | Land development | 4,684.21 | 3,181.82 | 1,333.33 | 0.00 | 2,933.33 |
| 2 | Improved crop production | 2,526.32 | 2,272.73 | 666.67 | 1,666.67 | 1,822.22 |
| 3 | Improved livestock management | 2,157.89 | 636.36 | 0.00 | 0.00 | 1,066.67 |

Source of additional investment: The data regarding Source of additional investment in Bikkanahalli micro watershed is presented in Table 44. The results indicate that, loan from bank was the source of additional investment capacity for 22.22 per cent for land development, for another 22.22 per cent for improved crop production and 13.33 per cent for improved livestock management. Own funds were the source of additional investment for 13.33 per cent for land development and 8.89 per cent for improved crop production. Soft loan was the source of additional investment capacity for 2.22 per cent for land development, for 6.67 per cent for improved crop production and for 6.67 per cent for improved livestock management.

Table 44: Source of additional investment in Bikkanahalli micro watershed

| Sl.No | Item | Land development | | Improved crop production | | Improved livestock management | |
|-------|----------------|------------------|-------|--------------------------|-------|-------------------------------|-------|
| | | N | % | N | % | N | % |
| 1 | Loan from bank | 10 | 22.22 | 10 | 22.22 | 6 | 13.33 |
| 2 | Own funds | 6 | 13.33 | 4 | 8.89 | 0 | 0.0 |
| 3 | Soft loan | 1 | 2.22 | 3 | 6.67 | 3 | 6.67 |

Marketing of the agricultural produce: The data regarding marketing of the agricultural produce in Bikkanahalli micro-watershed is presented in Table 45. The results indicated that, all crops were sold to the extent of 100 per cent except blackgram (66.67), sorghum (96.94%) and sunflower (98.41%).

Table 45. Marketing of the agricultural produce in Bikkanahalli micro-watershed

| Sl.No | Crops | Output obtained (q) | Output retained (q) | Output sold (q) | Output sold (%) | Avg. Price obtained (Rs/q) |
|-------|------------|---------------------|---------------------|-----------------|-----------------|----------------------------|
| 1 | Arecanut | 5.0 | 0.0 | 5.0 | 100.0 | 2000.0 |
| 2 | Bajra | 98.0 | 0.0 | 98.0 | 100.0 | 1480.0 |
| 3 | Bengalgram | 10.0 | 0.0 | 10.0 | 100.0 | 3500.0 |
| 4 | Blackgram | 3.0 | 1.0 | 2.0 | 66.67 | 3500.0 |
| 5 | Chilly | 10.0 | 0.0 | 10.0 | 100.0 | 1800.0 |
| 6 | Greengram | 2.0 | 0.0 | 2.0 | 100.0 | 3000.0 |
| 7 | Horsegram | 3.0 | 0.0 | 5.0 | 100.0 | 1800.0 |
| 8 | Jowar | 9.0 | 0.0 | 9.0 | 100.0 | 1400.0 |
| 9 | Maize | 439.0 | 0.0 | 439.0 | 100.0 | 1142.86 |
| 10 | Navane | 3.0 | 0.0 | 3.0 | 100.0 | 3000.0 |
| 11 | Onion | 10.0 | 0.0 | 10.0 | 100.0 | 1200.0 |
| 12 | Redgram | 4.0 | 0.0 | 4.0 | 100.0 | 1500.0 |
| 13 | Sorghum | 98.0 | 3.0 | 95.0 | 96.94 | 1385.71 |
| 14 | Sunflower | 63.0 | 1.0 | 62.0 | 98.41 | 2508.33 |

Marketing Channels used for sale of agricultural produce: The data regarding marketing channels used for sale of agricultural produce in Bikkanahalli micro-watershed is presented in Table 46. The results indicated that, about 46.67 per cent of the famers have sold their produce in regulated markets, 77.78 per cent of the farmers have sold to local/village merchants and 2.22 per cent have sold their produce to cooperative marketing society.

Table 46. Marketing Channels used for sale of agricultural produce in Bikkanahalli micro-watershed

| Sl. No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|---------|-------------------------------|--------|---|---------|-------|---------|--------|---------|-------|---------|--------|--------|-----|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Local/village Merchant | 0 | 0 | 16 | 84.21 | 14 | 127.27 | 3 | 50 | 1 | 33.33 | 1 | 100 | 35 | 77.78 |
| 2 | Regulated Market | 0 | 0 | 5 | 26.32 | 2 | 18.18 | 6 | 100 | 8 | 266.67 | 0 | 0 | 21 | 46.67 |
| 3 | Cooperative marketing Society | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 16.67 | 0 | 0 | 0 | 0 | 1 | 2.22 |

Mode of transport of agricultural produce: The data regarding mode of transport of agricultural produce in Bikkanahalli micro-watershed is presented in Table 47. The results indicated that, 122.22 per cent of the households have used tractor as a mode of transportation for their agricultural produce and 2.22 per cent have used truck as a mode of transport for their agricultural produce.

Table 47. Mode of transport of agricultural produce in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|------|---------|--------|---------|--------|---------|--------|---------|--------|--------|--------|----------|--------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Tractor | 0 | 0.00 | 21 | 110.53 | 16 | 145.45 | 9 | 150.00 | 8 | 266.67 | 1 | 100.00 | 55 | 122.22 |
| 2 | Truck | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 16.67 | 0 | 0.00 | 0 | 0.00 | 1 | 2.22 |

Incidence of soil and water erosion problems: The data regarding incidence of soil and water erosion problems in Bikkanahalli micro-watershed is presented in Table 48. The results indicated that, 86.67 per cent of the households have experienced soil and water erosion problems in the farm i.e., 89.47 per cent of the marginal farmers, 100 per cent of the small farmers, 100 per cent of semi medium, 100 per cent of medium and large farmers have experienced soil and water erosion problems.

Table 48. Incidence of soil and water erosion problems in Bikkanahalli micro-watershed

| Sl. No. | Particulars | LL(5) | | MF(19) | | SF(11) | | SMF(6) | | MDF(3) | | LF(1) | | All(45) | |
|---------|---|-------|---|--------|-------|--------|--------|--------|-----|--------|-----|-------|-----|---------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Soil and water erosion problems in the farm | 0 | 0 | 17 | 89.47 | 11 | 100.00 | 6 | 100 | 3 | 100 | 1 | 100 | 38 | 86.67 |

Interest shown towards soil testing: The data regarding incidence of soil and water erosion problems in Bikkanahalli micro-watershed is presented in Table 49. The results indicated that, 80 per cent have shown interest in soil test i.e 94.74 per cent of marginal, 90.91 per cent of small, 66.67 per cent of semi medium, 100 per cent of medium and large farmers.

Table 49. Interest shown towards soil testing in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-----------------------|--------|---|---------|-------|---------|-------|---------|-------|---------|-----|--------|-----|----------|----|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Interest in soil test | 0 | 0 | 18 | 94.74 | 10 | 90.91 | 4 | 66.67 | 3 | 100 | 1 | 100 | 36 | 80 |

Usage pattern of fuel for domestic use: The data regarding usage pattern of fuel for domestic use in Bikkanahalli micro-watershed is presented in Table 50. The results indicated that, 84.44 per cent of the households used firewood and 17.78 per cent used LPG as a source of fuel.

Table 50. Usage pattern of fuel for domestic use in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|----|---------|-------|---------|-------|---------|-------|---------|--------|--------|-----|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Fire Wood | 3 | 60 | 15 | 78.95 | 10 | 90.91 | 5 | 83.33 | 4 | 133.33 | 1 | 100 | 38 | 84.44 |
| 2 | LPG | 2 | 40 | 4 | 21.05 | 1 | 9.09 | 1 | 16.67 | 0 | 0 | 0 | 0 | 8 | 17.78 |

Source of drinking water: The data regarding source of drinking water in Bikkanahalli micro-watershed is presented in Table 51. The results indicated that, bore well was the major source of drinking water for 28.89 per cent of the households, piped supply was the source of drinking water for 60 per cent of the households and lake/tank was the major source of drinking water for 4.44 per cent of the households and canal/nala was the source of drinking water for 2.22 per cent of the households in the micro watershed.

Table 51. Source of drinking water in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|--------------|--------|-----|---------|-------|---------|-------|---------|-------|---------|-------|--------|-----|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Piped supply | 5 | 100 | 13 | 68.42 | 6 | 54.55 | 1 | 16.67 | 1 | 33.33 | 1 | 100 | 27 | 60 |
| 2 | Bore Well | 0 | 0 | 6 | 31.58 | 3 | 27.27 | 3 | 50 | 1 | 33.33 | 0 | 0 | 13 | 28.89 |
| 3 | Lake/ Tank | 0 | 0 | 0 | 0 | 1 | 9.09 | 1 | 16.67 | 0 | 0 | 0 | 0 | 2 | 4.44 |
| 4 | Canal/Nala | 0 | 0 | 0 | 0 | 1 | 9.09 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2.22 |

Source of light: The data regarding source of light in Bikkanahalli micro-watershed is presented in Table 52. The results indicated that, Electricity was the major source of light for 100 per cent of the households in micro watershed.

Table 52. Source of light in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|--------|---------|--------|---------|--------|---------|--------|---------|--------|--------|--------|----------|--------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Electricity | 5 | 100.00 | 19 | 100.00 | 11 | 100.00 | 6 | 100.00 | 3 | 100.00 | 1 | 100.00 | 45 | 100.00 |

Existence of Sanitary toilet facility: The data regarding existence of sanitary toilet facility in Bikkanahalli micro-watershed is presented in Table 53. The results indicated that, 42.22 per cent of the households possess sanitary toilet i.e. 21.05 per cent of the marginal farmers, 36.36 per cent of the small farmers, 33.33 per cent of the semi medium farmers, 100 per cent of the landless, medium and large farmers.

Table 53. Existence of Sanitary toilet facility in Bikkanahalli micro-watershed

| Sl. No. | Particulars | LL (5) | | MF(19) | | SF (11) | | SMF(6) | | MDF(3) | | LF (1) | | All (45) | |
|---------|--------------------------|--------|--------|--------|-------|---------|-------|--------|-------|--------|--------|--------|--------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Sanitary toilet facility | 5 | 100.00 | 4 | 21.05 | 4 | 36.36 | 2 | 33.33 | 3 | 100.00 | 1 | 100.00 | 19 | 42.22 |

Possession of PDS card: The data regarding possession of PDS card in Bikkanahalli micro-watershed is presented in Table 54. The results indicated that, 95.56 per cent of the sampled households possessed BPL card, 4.44 per cent of the households possessed APL card and 2.22 per cent of the households did not possess PDS card.

Table 54. Possession of PDS card in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|---------------|--------|--------|---------|-------|---------|--------|---------|-------|---------|-------|--------|--------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | APL | 0 | 0.00 | 1 | 5.26 | 0 | 0.00 | 0 | 0.00 | 1 | 33.33 | 0 | 0.00 | 2 | 4.44 |
| 2 | BPL | 5 | 100.00 | 18 | 94.74 | 12 | 109.09 | 5 | 83.33 | 2 | 66.67 | 1 | 100.00 | 43 | 95.56 |
| 3 | Not Possessed | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 16.67 | 0 | 0.00 | 0 | 0.00 | 1 | 2.22 |

Participation in NREGA program: The data regarding participation in NREGA programme in Bikkanahalli micro-watershed is presented in Table 55. The results indicated that, 42.22 per cent of the households participated in NREGA programme.

Table 55. Participation in NREGA programme in Bikkanahalli micro-watershed

| Sl. No. | Particulars | LL(5) | | MF(19) | | SF(11) | | SMF(6) | | MDF(3) | | LF(1) | | All(45) | |
|---------|----------------------------------|-------|----|--------|-------|--------|-------|--------|----|--------|-------|-------|-----|---------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Participation in NREGA programme | 4 | 80 | 4 | 21.05 | 6 | 54.55 | 3 | 50 | 1 | 33.33 | 1 | 100 | 19 | 42.22 |

Adequacy of food items: The data regarding adequacy of food items in Bikkanahalli micro-watershed is presented in Table 56. The results indicated that, cereals were adequate for 91.11 per cent of the households, pulses were adequate for 51.11 per cent, oilseeds were adequate for 11.11 per cent, vegetables were adequate for 46.67 per cent, fruits were adequate for 6.67 per cent, milk was adequate for 57.78 per cent, eggs were adequate for 31.11 per cent and meat was adequate for 20 per cent.

Table 56. Adequacy of food items in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|--------|---------|-------|---------|--------|---------|-------|---------|--------|--------|--------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Cereals | 5 | 100.00 | 17 | 89.47 | 11 | 100.00 | 4 | 66.67 | 3 | 100.00 | 1 | 100.00 | 41 | 91.11 |
| 2 | Pulses | 5 | 100.00 | 10 | 52.63 | 6 | 54.55 | 0 | 0.00 | 1 | 33.33 | 1 | 100.00 | 23 | 51.11 |
| 3 | Oilseed | 0 | 0.00 | 3 | 15.79 | 2 | 18.18 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 5 | 11.11 |
| 4 | Vegetables | 1 | 20.00 | 10 | 52.63 | 6 | 54.55 | 2 | 33.33 | 2 | 66.67 | 0 | 0.00 | 21 | 46.67 |
| 5 | Fruits | 1 | 20.00 | 1 | 5.26 | 1 | 9.09 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 3 | 6.67 |
| 6 | Milk | 1 | 20.00 | 10 | 52.63 | 11 | 100.00 | 3 | 50.00 | 1 | 33.33 | 0 | 0.00 | 26 | 57.78 |
| 7 | Egg | 0 | 0.00 | 9 | 47.37 | 2 | 18.18 | 1 | 16.67 | 1 | 33.33 | 1 | 100.00 | 14 | 31.11 |
| 8 | Meat | 0 | 0.00 | 5 | 26.32 | 1 | 9.09 | 1 | 16.67 | 1 | 33.33 | 1 | 100.00 | 9 | 20.00 |

Response on Inadequacy of food items: The data regarding inadequacy of food items in Bikkanahalli micro-watershed is presented in Table 57. The results indicated that, cereals were inadequate for 8.89 per cent of the households, pulses were inadequate for 48.89 per cent of the households, oilseeds were inadequate for 84.44 per cent, vegetables were inadequate for 44.44 per cent, fruits were inadequate for 77.78 per cent, milk was inadequate for 31.11 per cent, eggs were inadequate for 62.22 per cent and meat was inadequate for 51.11 per cent of the households.

Table 57. Response on Inadequacy of food items in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|--------|---------|-------|---------|-------|---------|--------|---------|--------|--------|--------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Cereals | 0 | 0.00 | 2 | 10.53 | 0 | 0.00 | 2 | 33.33 | 0 | 0.00 | 0 | 0.00 | 4 | 8.89 |
| 2 | Pulses | 0 | 0.00 | 9 | 47.37 | 5 | 45.45 | 6 | 100.00 | 2 | 66.67 | 0 | 0.00 | 22 | 48.89 |
| 3 | Oilseed | 5 | 100.00 | 15 | 78.95 | 8 | 72.73 | 6 | 100.00 | 3 | 100.00 | 1 | 100.00 | 38 | 84.44 |
| 4 | Vegetables | 4 | 80.00 | 7 | 36.84 | 3 | 27.27 | 4 | 66.67 | 1 | 33.33 | 1 | 100.00 | 20 | 44.44 |
| 5 | Fruits | 4 | 80.00 | 14 | 73.68 | 9 | 81.82 | 4 | 66.67 | 3 | 100.00 | 1 | 100.00 | 35 | 77.78 |
| 6 | Milk | 4 | 80.00 | 4 | 21.05 | 2 | 18.18 | 3 | 50.00 | 1 | 33.33 | 0 | 0.00 | 14 | 31.11 |
| 7 | Egg | 3 | 60.00 | 10 | 52.63 | 9 | 81.82 | 4 | 66.67 | 2 | 66.67 | 0 | 0.00 | 28 | 62.22 |
| 8 | Meat | 2 | 40.00 | 9 | 47.37 | 9 | 81.82 | 1 | 16.67 | 1 | 33.33 | 1 | 100.00 | 23 | 51.11 |

Response on Market surplus of food items: The data regarding market surplus of food items in Bikkanahalli micro-watershed is presented in Table 58. The results indicated

that, oilseeds were market surplus for 2.22 per cent, fruits were market surplus for 11.11 per cent and milk was market surplus for 2.22 per cent of the households.

Table 58. Response on Market surplus of food items in Bikkanahalli micro-watershed

| Sl.No. | Particulars | LL (5) | | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|--------|-------------|--------|------|---------|-------|---------|------|---------|-------|---------|------|--------|------|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Oilseed | 0 | 0.00 | 1 | 5.26 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.22 |
| 2 | Fruits | 0 | 0.00 | 3 | 15.79 | 1 | 9.09 | 1 | 16.67 | 0 | 0.00 | 0 | 0.00 | 5 | 11.11 |
| 3 | Milk | 0 | 0.00 | 1 | 5.26 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.22 |

Farming constraints; The data regarding farming constraints experienced by households in Bikkanahalli micro-watershed is presented in Table 59. The results indicated that, lower fertility status of the soil was the constraint experienced by 84.44 per cent of the households, wild animal menace on farm field (71.11%), frequent incidence of pest and diseases (46.67%), inadequacy of irrigation water (13.33%), high cost of fertilizers and plant protection chemicals (35.56%), high rate of interest on credit (40%), low price for the agricultural commodities (51.11%), lack of marketing facilities in the area (57.78%), lack of transport for safe transport of the agricultural produce to the market (80%), inadequate extension services (24.44%), less rainfall (22.22%) and source of agri-technology information (17.78%).

Table 59. Farming constraints Experienced in Bikkanahalli micro-watershed

| Sl. No. | Particulars | MF (19) | | SF (11) | | SMF (6) | | MDF (3) | | LF (1) | | All (45) | |
|---------|--|---------|-------|---------|--------|---------|-------|---------|-------|--------|-----|----------|-------|
| | | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | Lower fertility status of the soil | 19 | 100 | 9 | 81.82 | 6 | 100 | 3 | 100 | 1 | 100 | 38 | 84.44 |
| 2 | Wild animal menace on farm field | 15 | 78.95 | 9 | 81.82 | 4 | 66.67 | 3 | 100 | 1 | 100 | 32 | 71.11 |
| 3 | Frequent incidence of pest and diseases | 11 | 57.89 | 8 | 72.73 | 1 | 16.67 | 1 | 33.33 | 0 | 0 | 21 | 46.67 |
| 4 | Inadequacy of irrigation water | 4 | 21.05 | 1 | 9.09 | 0 | 0 | 1 | 33.33 | 0 | 0 | 6 | 13.33 |
| 5 | High cost of Fertilizers and plant protection chemicals | 7 | 36.84 | 4 | 36.36 | 4 | 66.67 | 1 | 33.33 | 0 | 0 | 16 | 35.56 |
| 6 | High rate of interest on credit | 7 | 36.84 | 5 | 45.45 | 2 | 33.33 | 3 | 100 | 1 | 100 | 18 | 40 |
| 7 | Low price for the agricultural commodities | 11 | 57.89 | 9 | 81.82 | 1 | 16.67 | 1 | 33.33 | 1 | 100 | 23 | 51.11 |
| 8 | Lack of marketing facilities in the area | 13 | 68.42 | 8 | 72.73 | 3 | 50 | 1 | 33.33 | 1 | 100 | 26 | 57.78 |
| 9 | Inadequate extension services | 7 | 36.84 | 2 | 18.18 | 1 | 16.67 | 1 | 33.33 | 0 | 0 | 11 | 24.44 |
| 10 | Lack of transport for safe transport of the Agril produce to the market. | 15 | 78.95 | 15 | 136.36 | 4 | 66.67 | 2 | 66.67 | 0 | 0 | 36 | 80 |
| 11 | Less rainfall | 5 | 26.32 | 3 | 27.27 | 2 | 33.33 | 0 | 0 | 0 | 0 | 10 | 22.22 |
| 12 | Source of Agri-technology information(Newspaper/TV/ Mobile) | 3 | 15.79 | 1 | 9.09 | 3 | 50 | 1 | 33.33 | 0 | 0 | 8 | 17.78 |

SUMMARY

In order to assess the socio-economic condition of the farmers in the watershed a comprehensive questionnaire was prepared. Major components such as demographic conditions, migration details, food consumption and family expenditure pattern, material possession, land holding, land use management, cropping pattern, cost of cultivation of crops, livestock management. The statistical components such as frequency and percentage were used to analyze the data. About 45 households located in the micro watershed were interviewed for the survey.

The data indicated that there were 131 (59.01%) men and 91 (40.99%) women among the sampled households. The average family size of landless farmers' was 4.8, marginal farmers' was 4.3, small farmers' was 5.27, semi medium farmers' was 5, medium farmers' was 7.33 and large farmers' was 6.

The data indicated that, 42 (18.92%) people were in 0-15 years of age, 95 (42.79%) were in 16-35 years of age, 64 (28.83%) were in 36-60 years of age and 21 (9.46%) were above 61 years of age.

The results indicated that Bikkanahalli had 23.87 per cent illiterates, 25.68 per cent of them had primary school education, 6.76 per cent of them had middle school education, 16.67 per cent of them had high school education, 9.91 per cent of them had PUC education, 0.90 per cent had diploma, 4.50 per cent of them did ITI, 9.46 per cent of them had degree education and 0.45 per cent did masters.

The results indicate that, 82.22 per cent of households were practicing agriculture and 17.78 per cent of the households were agricultural labourers. The results indicate that agriculture was the major occupation for 42.34 per cent of the household members, 22.97 per cent were agricultural laborers, 0.90 per cent of the households general labourers, 0.90 per cent of the households were in government service, 1.35 per cent were in private service, 27.48 per cent were students and 1.80 per cent were children.

The results show that 98.65 per cent of the population in the micro watershed has not participated in any local institutions, 0.45 per cent of the population participated in sthree shakthi sangha and 0.90 per cent participated in self help group.

The results indicate that 4.44 per cent of the households possess thatched house, 84.44 per cent of the households possess Katcha house and 11.11 per cent of the households possess pucca/RCC house.

The results show that 4.44 per cent of the households possess radio, 75.56 per cent of the households possess TV, 24.44 per cent of the households possess Mixer grinder, 6.67 per cent of the households possess bicycle, 28.89 per cent of the households possess motor cycle, 2.22 per cent of the households possess landline phone and 95.56 per cent of

the households possess mobile phones. The results show that the average value of radio was Rs.750, television was Rs.5426, mixer grinder was Rs.1290, bicycle was Rs. 866, motor cycle was Rs.31307, landline phone was Rs.1250 and mobile phone was Rs.2281.

About 22.22 per cent of the households possess bullock cart, 8.89 per cent of the households possess plough, 2.22 per cent of them possess seed/fertilizer drill, 2.22 per cent of them possess tractor, 2.22 per cent of them possess sprayer and 20 per cent of them possess weeder. The results show that the average value of bullock cart was Rs.22400, the average value of plough was Rs.2250, the average value of seed/fertilizer drill was Rs.3000, the average value of tractor was Rs.300000, the average value of sprayer was Rs.2000 and the average value of weeder was Rs.50.

The results indicate that, 22.22 per cent of the households possess bullocks, 11.11 per cent of the households possess local cow, 6.67 per cent of them possess buffalo and 2.22 per cent of the households possess poultry birds.

The results indicate that, average own labour men available in the micro watershed was 1.93, average own labour (women) available was 1.23, average hired labour (men) available was 7.55 and average hired labour (women) available was 7.38. The results indicate that, 62.22 per cent of the households opined that the hired labour was adequate and 24.44 per cent of the households opined that the hired labour was inadequate.

The results indicate that, households of the Bikkanahalli micro-watershed possess 73.47 ha (89.81%) of dry land and 8.34 ha (10.19%) of irrigated land. Marginal farmers possess 12.10 ha (96.76%) of dry land and 0.40 ha (3.24%) of irrigated land. Small farmers possess 17.42 ha (100%) of dry land. Semi medium farmers possess 6.48 ha (65.04%) of dry land and 3.48 per cent (34.96%) of irrigated land. Medium farmers possess 9.15 ha (67.26%) of dry land and 4.45 ha (32.74%) of irrigated land; large farmers possess 28.33 ha (100%) of dry land.

The results indicate that, the average value of dry land was Rs. 151,492.43 and average value of irrigated land was Rs. 389,684.47. In case of marginal famers, the average land value was Rs. 417,034.44 for dry land and Rs. 1,235,000 for irrigated land. In case of small famers, the average land value was Rs. 225,823.66 for dry land. In case of semi medium famers, the average land value was Rs. 192,968.75 for dry land and Rs. 545,697.68 for irrigated land. In case of medium famers, the average land value was Rs. 65,575.22 for dry land and Rs. 190,863.64 for irrigated land and in case of large farmers it was Rs. 10,585.71 for dry land.

The results indicate that, there were 8 functioning and 5 de-functioning bore wells in the micro watershed. The results indicate that, bore well was the major irrigation source in the micro water shed for 17.78 per cent of the farmers. The results indicate that, the depth of bore well was found to be 14.09 meters.

The results indicate that, marginal, semi medium and medium farmers had irrigated area of 1.21 ha, 3.08 ha and 4.45 ha respectively. The results indicate that, farmers have grown maize (21.98 ha), bajra (6.30 ha), sunflower (6.73 ha), Bengal gram (1.42 ha), sorghum (8.42 ha), redgram (1.82 ha), navane (1.01), blackgram (0.40), Greengram (0.81), horsegram (0.81), onion (0.40) and chilly (0.65 ha).

The results indicate that, the cropping intensity in Bikkanahalli micro-watershed was found to be 66.07 per cent. In case of marginal farmers it was 86.40 per cent, small farmers it was 76.21 per cent, in case of semi medium farmers it was 81.46, medium farmers it was 45.35 per cent and in case of large farmers it was 100 per cent.

The results indicate that, 75.56 per cent of the households have bank account and 24.44 per cent have savings. The results indicate that, 44.44 per cent of the households have availed credit from different sources.

The results indicate that, the total cost of cultivation for maize was Rs. 46549.67. The gross income realized by the farmers was Rs. 33923.77. The net income from Maize cultivation was Rs. -12625.90, thus the benefit cost ratio was found to be 1:0.73. The total cost of cultivation for redgram was Rs. 36636.55. The gross income realized by the farmers was Rs. 4763.57. The net income from redgram cultivation was Rs. -31872.97. Thus the benefit cost ratio was found to be 1:0.13. The total cost of cultivation for bajra was Rs. 31736.21. The gross income realized by the farmers was Rs. 18149.41. The net income from bajra cultivation was Rs. -13586.80. Thus the benefit cost ratio was found to be 1:0.57. The total cost of cultivation for Green gram was Rs. 20029.78. The gross income realized by the farmers was Rs. 7410. The net income from Green gram cultivation was Rs. -12619.78. Thus the benefit cost ratio was found to be 1:0.37. The total cost of cultivation for chilly was Rs. 30931.31. The gross income realized by the farmers was Rs. 27787.50. The net income from chilly cultivation was Rs. -3143.81. Thus the benefit cost ratio was found to be 1:0.9. The total cost of cultivation for sunflower was Rs. 37640.24. The gross income realized by the farmers was Rs. 22297.69. The net income from sunflower cultivation was Rs. -15342.56. Thus the benefit cost ratio was found to be 1:0.59. The total cost of cultivation for bengal gram was Rs. 49117.08. The gross income realized by the farmers was Rs. 25214.58. The net income from bengal gram cultivation was Rs. -23902.50. Thus the benefit cost ratio was found to be 1:0.51. The total cost of cultivation for sorghum was Rs. 25990.03. The gross income realized by the farmers was Rs. 17599.03. The net income from sorghum cultivation was Rs. -8391.01. Thus the benefit cost ratio was found to be 1:0.68. The total cost of cultivation for navane was Rs. 22542.34. The gross income realized by the farmers was Rs. 8892. The net income from navane cultivation was Rs. -13650.34. Thus the benefit cost ratio was found to be 1:0.39. The total cost of cultivation for blackgram was Rs. 29957.73. The gross income realized by the farmers was Rs. 25935. The net income from blackgram cultivation was Rs. -4022.73. Thus the benefit cost ratio was found to be 1:0.87. The total

cost of cultivation for horsegram was Rs. 34435.29. The gross income realized by the farmers was Rs. 6669. The net income from horsegram cultivation was Rs. -27766.29. Thus the benefit cost ratio was found to be 1:0.19. The total cost of cultivation for onion was Rs. 89144.62. The gross income realized by the farmers was Rs. 29640. The net income from onion cultivation was Rs. -59504.62. Thus the benefit cost ratio was found to be 1:0.33.

The results indicate that, 28.89 per cent of the households opined that dry fodder was adequate and 2.22 per cent opined that dry fodder was inadequate.

The results indicate that the average annual gross income was Rs. 27,000 for landless farmers, for marginal farmers it was Rs. 43,955.79, for small farmers it was Rs. 40,545.45, for semi medium farmers it was Rs. 135,300, for medium farmers it was Rs. 170,333.33 and for large farmers it was Rs. 25,000.

The results indicate that the average annual expenditure is Rs. 5,601.85. For landless households it was Rs. 1,500, for marginal farmers it was Rs. 1,820.18, for small farmers it was Rs. 2,727.27, for semi medium farmers it was Rs. 9,111.11, for medium farmers it was Rs. 30,111.11 and for large farmers it was Rs. 35,000.

The results indicate that, sampled households have grown 23 coconut, 1 custard apple, 1 lime and 2 mango tree in their fields. The results indicate that, households have planted 37 neem trees, 6 tamarind trees, 1 acacia, 18 teak and 5 banyan trees in their fields.

The results indicate that, the average additional investment capacity with the households for land development was Rs. 2933.33, for improved crop production Rs.1822.22 and for improved livestock management Rs. 1066.67. The results indicate that, loan from bank was the source of additional investment capacity for 22.22 per cent for land development, for another 22.22 per cent for improved crop production and 13.33 per cent for improved livestock management. Own funds were the source of additional investment for 13.33 per cent for land development and 8.89 per cent for improved crop production. Soft loan was the source of additional investment capacity for 2.22 per cent for land development, for 6.67 per cent for improved crop production and for 6.67 per cent for improved livestock management.

The results indicated that, all crops were sold to the extent of 100 per cent except blackgram (66.67), sorghum (96.94%) and sunflower (98.41%). The results indicated that, about 46.67 per cent of the famers have sold their produce in regulated markets, 77.78 per cent of the farmers have sold to local/village merchants and 2.22 per cent have sold their produce to cooperative marketing society. The results indicated that, 122.22 per cent of the households have used tractor as a mode of transportation for their agricultural produce and 2.22 per cent have used truck as a mode of transport for their agricultural produce.

The results indicated that, 86.67 per cent of the households have experienced soil and water erosion problems in the farm i.e., 89.47 per cent of the marginal farmers, 100 per cent of the small farmers, 100 per cent of semi medium, 100 per cent of medium and large farmers have experienced soil and water erosion problems.

The results indicated that, 80 per cent have shown interest in soil test i.e 94.74 per cent of marginal, 90.91 per cent of small, 66.67 per cent of semi medium, 100 per cent of medium and large farmers.

The results indicated that, 84.44 per cent of the households used firewood and 17.78 per cent used LPG as a source of fuel. The results indicated that, bore well was the major source of drinking water for 28.89 per cent of the households, piped supply was the source of drinking water for 60 per cent of the households and lake/tank was the major source of drinking water for 4.44 per cent of the households and canal/nala was the source of drinking water for 2.22 per cent of the households in the micro watershed.

Electricity was the major source of light for 100 per cent of the households in micro watershed. The results indicated that, 42.22 per cent of the households possess sanitary toilet i.e. 21.05 per cent of the marginal farmers, 36.36 per cent of the small farmers, 33.33 per cent of the semi medium farmers, 100 per cent of the landless, medium and large farmers.

The results indicated that, 95.56 per cent of the sampled households possessed BPL card, 4.44 per cent of the households possessed APL card and 2.22 per cent of the households did not possess PDS card. The results indicated that, 42.22 per cent of the households participated in NREGA programme.

The results indicated that, cereals were adequate for 91.11 per cent of the households, pulses were adequate for 51.11 per cent, oilseeds were adequate for 11.11 per cent, vegetables were adequate for 46.67 per cent, fruits were adequate for 6.67 per cent, milk was adequate for 57.78 per cent, eggs were adequate for 31.11 per cent and meat was adequate for 20 per cent.

The results indicated that, cereals were inadequate for 8.89 per cent of the households, pulses were inadequate for 48.89 per cent of the households, oilseeds were inadequate for 84.44 per cent, vegetables were inadequate for 44.44 per cent, fruits were inadequate for 77.78 per cent, milk was inadequate for 31.11 per cent, eggs were inadequate for 62.22 per cent and meat was inadequate for 51.11 per cent of the households.

The results indicated that, oilseeds were market surplus for 2.22 per cent, fruits were market surplus for 11.11 per cent and milk was market surplus for 2.22 per cent of the households.

The results indicated that, lower fertility status of the soil was the constraint experienced by 84.44 per cent of the households, wild animal menace on farm field (71.11%), frequent incidence of pest and diseases (46.67%), inadequacy of irrigation water (13.33%), high cost of fertilizers and plant protection chemicals (35.56%), high rate of interest on credit (40%), low price for the agricultural commodities (51.11%), lack of marketing facilities in the area (57.78%), lack of transport for safe transport of the agricultural produce to the market (80%), inadequate extension services (24.44%), less rainfall (22.22%) and source of agri-technology information (17.78%).